



**Comparative Effectiveness Review  
Number 253**

# **Maternal and Child Outcomes Associated With the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)**



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**Maternal and Child Outcomes Associated With the  
Special Supplemental Nutrition Program for Women,  
Infants, and Children (WIC)**

**Prepared for:**

Agency for Healthcare Research and Quality  
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The information in this report is intended to help healthcare decision makers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of healthcare services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

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## Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of systematic reviews to assist public- and private-sector organizations in their efforts to improve the quality of healthcare in the United States. These reviews provide comprehensive, science-based information on common, costly medical conditions, and new healthcare technologies and strategies.

Systematic reviews are the building blocks underlying evidence-based practice; they focus attention on the strength and limits of evidence from research studies about the effectiveness and safety of a clinical intervention. In the context of developing recommendations for practice, systematic reviews can help clarify whether assertions about the value of the intervention are

based on strong evidence from clinical studies. For more information about AHRQ EPC systematic reviews, see [www.effectivehealthcare.ahrq.gov/reference/purpose.cfm](http://www.effectivehealthcare.ahrq.gov/reference/purpose.cfm).

AHRQ expects that these systematic reviews will be helpful to health plans, providers, purchasers, government programs, and the healthcare system as a whole. Transparency and stakeholder input are essential to the Effective Health Care Program. Please visit the website ([www.effectivehealthcare.ahrq.gov](http://www.effectivehealthcare.ahrq.gov)) to see draft research questions and reports or to join an email list to learn about new program products and opportunities for input.

If you have comments on this systematic review, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to [epc@ahrq.hhs.gov](mailto:epc@ahrq.hhs.gov).

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## Technical Expert Panel

In designing the study questions and methodology at the outset of this report, the EPC consulted several technical and content experts. Broad expertise and perspectives were sought. Divergent and conflicted opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Therefore, in the end, study questions, design, methodologic approaches, and/or conclusions do not necessarily represent the views of individual technical and content experts.

Technical Experts must disclose any financial conflicts of interest greater than \$5,000 and any other relevant business or professional conflicts of interest. Because of their unique clinical or content expertise, individuals with potential conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any potential conflicts of interest identified.

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Prior to publication of the final evidence report, EPCs sought input from independent Peer Reviewers without financial conflicts of interest. However, the conclusions and synthesis of the scientific literature presented in this report do not necessarily represent the views of individual reviewers.

Peer Reviewers must disclose any financial conflicts of interest greater than \$5,000 and any other relevant business or professional conflicts of interest. Because of their unique clinical or content expertise, individuals with potential nonfinancial conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

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# Maternal and Child Outcomes Associated With the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

## Structured Abstract

**Objectives.** The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) aims to safeguard the health of low-income, nutritionally at-risk pregnant and postpartum women and children less than 5 years old. This systematic review evaluates whether participation in WIC is associated with nutrition and health outcomes for women, infants, and children, and whether the associations vary by duration of participation or across subgroups. Because of major revisions to the WIC food package in 2009, we prioritized studies published since 2009 and included studies comparing outcomes before and after the 2009 food package change.

**Data sources.** Using electronic publication databases, we conducted a literature search from January 2009 to September 2021 and a targeted search for selected outcomes from January 2000 to September 2021.

**Review methods.** Paired team members independently screened search results, serially abstracted data, assessed risk of bias, and graded strength of evidence (SOE) using standard methods for observational studies.

**Results.** We included 82 quantitative observational studies and 16 qualitative studies, with 49 studies comparing outcomes of WIC participants with WIC-eligible non-participants. WIC prenatal participation was associated with lower risk of three outcomes: preterm delivery (moderate SOE), low birth weight (moderate SOE), and infant mortality (moderate SOE). Prenatal WIC participation was associated with better maternal diet quality (low SOE), lower risk of inadequate gestational weight gain (low SOE), lower alcohol use in pregnancy (low SOE), and no difference in smoking (low SOE). Maternal WIC participation was associated with increased child preventive care and immunizations (each low SOE), and higher cognitive scores for children (low SOE). Child WIC participation was associated with better diet quality (moderate SOE), and greater intakes of 100 percent fruit juice, whole grain cereals, and age-appropriate milk (moderate SOE). Household WIC participation was associated with greater purchasing of healthy food groups (moderate SOE). Maternal WIC participation was not associated with breastfeeding initiation (moderate SOE). The evidence was insufficient for other outcomes related to maternal health and child growth. The evidence generally was insufficient on how WIC participation affects outcomes across subgroups.

**Conclusions.** Maternal WIC participation was associated with improved birth outcomes, lower infant mortality, and better child cognitive development. WIC participation was associated with purchasing healthier foods and with improved diets for pregnant women and children. More research is needed on maternal health outcomes; food security; child growth, development, and academic achievement; and effectiveness of WIC in all segments of the eligible population.

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# **Executive Summary**

## **Main Points**

### **Maternal and Neonatal Birth Outcomes**

- Maternal participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) may be associated with a lower likelihood of inadequate gestational weight gain (Strength of evidence [SOE]: Low), lower alcohol use in pregnancy (SOE: Low), no difference in smoking during or after pregnancy (SOE: Low), no difference in perinatal death overall (SOE: Low), and lower risk of stillbirth in Black women (SOE: Low).
- Maternal WIC participation during pregnancy is likely to be associated with lower risk of preterm birth and lower risk of low birth weight infants (SOE: Moderate).
- The evidence was insufficient to determine whether maternal WIC participation was associated with decreased neonatal intensive care unit (NICU) stays.

### **Maternal Dietary Outcomes**

- WIC participation during pregnancy may be associated with better diet quality and greater intakes of total fruit (SOE: Low).
- The evidence was insufficient to determine whether maternal WIC participation during pregnancy was associated with intake of other specific maternal nutrients.

### **Infant and Child Health Outcomes**

- Maternal WIC participation during pregnancy is likely to be associated with reductions in infant mortality (SOE: Moderate).
- Maternal WIC participation may be associated with increased child preventive care visits and immunizations during the first year of life (SOE: Low).
- Child WIC participation may be associated with increased immunizations of children (SOE: Low).
- The evidence was insufficient to determine whether either maternal or child participation was associated with other child health outcomes including child mortality and morbidity.

### **Child Anthropometric Status or Growth**

- The evidence was insufficient to determine whether child WIC participation was associated with weight status in children.

### **Breastfeeding Outcomes**

- Maternal WIC participation is likely to be associated with no difference in breastfeeding initiation rates (SOE: Moderate).
- WIC participation may be associated with no difference in the introduction of solid foods before 4 months of age (SOE: Low).
- The evidence was insufficient to determine whether maternal or child WIC participation was associated with longer duration of breastfeeding or breastfeeding exclusivity.



## Child Dietary Outcomes

- Child WIC participation is likely to be associated with better child diet quality and greater intakes of 100% fruit juice, whole grain cereals intake, and age-appropriate shifts from whole milk to lower fat milk (SOE: Moderate).
- Child WIC participation may be associated with higher intakes of vitamin D and iron, and for children 2 to 4 years, limiting saturated fat (SOE: Low).
- The evidence was insufficient to determine whether child WIC participation was associated with fruit or vegetable intakes.
- Household participation in WIC is likely to be associated with purchasing of healthy food groups and reduced purchasing of less healthy foods and beverages (SOE: Moderate).

## Child Development and Academic Achievement

- Maternal WIC participation may be associated with higher cognitive development scores in early childhood (SOE: Low), no differences in measures of child communication and adaptive behavior in early childhood (SOE: Low), and no differences in measures of child social development in early childhood (SOE: Low).
- The evidence was insufficient to determine whether child WIC participation was associated with cognitive development or whether maternal or child WIC participation was associated with other child development outcomes.

## Background and Purpose

WIC was established to improve the health of low-income women and children by providing nutritious supplemental foods, education, breastfeeding support, and referrals to healthcare and social service programs. This systematic review summarizes evidence on whether participation in WIC was associated with outcomes for women and children, focusing mainly on studies published since 2009, including studies evaluating outcomes before and after the federal regulatory change to the WIC food package in 2009. The Key Questions are briefly described below; please see the full report for details.

- **Key Question 1:** Among women who are eligible to participate in WIC, how is WIC participation during pregnancy associated with maternal and infant birth outcomes? Does the association vary by gestational age at WIC enrollment or duration of the mother's WIC participation or participant factors?

**Outcomes of interest:** Maternal health outcomes in pregnancy and postpartum (mortality, morbidity, anemia, mode of delivery, weight status, healthcare utilization, health behaviors), neonatal birth outcomes (fetal death, stillbirth and neonatal mortality, gestational age, birth weight, small/large for gestational age, NICU admission, hospital length of stay), breastfeeding, dietary outcomes of mothers, and food security

- **Key Question 2:** Among infants and children eligible to participate in WIC, how is WIC participation associated with dietary and health outcomes in childhood? Does the association vary by age at enrollment or duration of WIC participation or participant factors?

**Outcomes of interest:** Infant and child health outcomes (mortality, morbidity, anemia, healthcare utilization), child anthropometric status or growth outcomes, breastfeeding, dietary outcomes of infants and children, household purchases and benefit redemption, food security, child development and academic achievement

## Methods

The systematic review followed the Methods Guide for Effectiveness and Comparative Effectiveness Reviews (<https://effectivehealthcare.ahrq.gov/topics/ceer-methods-guide/overview>). We searched PubMed®, Embase®, CINAHL®, ERIC, SCOPUS, PsycINFO®, and the Cochrane Central Register of Controlled Trials for studies of outcomes associated with WIC participation, focusing on participation after the 2009 food package change and comparison to WIC-eligible non-participants. We conducted one search from January 2009 to September 2021 and another search for selected outcomes (infant mortality, maternal mortality, and child development and academic achievement) from January 2000 to September 2021. We also completed a grey literature search. Paired reviewers independently screened citations. Data were abstracted by one reviewer and checked by an experienced reviewer. See the full report for details.

## Results

We found 82 quantitative observational studies, including 49 studies with direct evidence regarding WIC participation and outcomes and 34 studies with indirect evidence based on evaluation of the 2009 food package change among WIC participants (1 study provided both direct and indirect evidence). Table A summarizes direct evidence regarding WIC participation and outcomes.

**Table A. Summary of the direct evidence regarding association between WIC participation and outcomes<sup>a</sup>**

| Outcomes                                      | Evidence on Association Between WIC Participation and Outcomes   | Insufficient Evidence Despite One or More Studies  |
|---|--|--|
| <b>Maternal health outcomes (KQ1)</b>         | <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>• Lower likelihood of inadequate gestational weight gain (1 study)</li> <li>• No difference in smoking during or after pregnancy (1 study)</li> <li>• Less alcohol use in pregnancy (1 study)</li> </ul>  | NA   |
| <b>Neonatal and birth outcomes (KQ1)</b>      | <p><b>Likely to be associated (Moderate SOE)</b></p> <ul style="list-style-type: none"> <li>• Less preterm birth (3 studies)</li> <li>• Lower risk of infant low birth weight (2 studies)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>• No difference in perinatal death overall (1 study)</li> <li>• Lower risk of stillbirth in Black women (1 study)</li> </ul> | <ul style="list-style-type: none"> <li>• NICU admission and hospital length of stay (1 study)</li> </ul> |
| <b>Maternal dietary outcomes (KQ1)</b>        | <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>• Better diet quality during pregnancy (1 study)</li> <li>• Greater intakes of total fruit during pregnancy (1 study)</li> </ul>  | NA   |
| <b>Infant and child health outcomes (KQ2)</b> | <p><b>Likely to be associated (Moderate SOE)</b></p> <ul style="list-style-type: none"> <li>• Lower infant mortality (2 studies)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>• Increased preventive care visits (1 maternal study)</li> <li>• Increased immunizations (1 maternal study and 2 child studies)</li> </ul>  | <ul style="list-style-type: none"> <li>• Morbidity - health status, hospitalization (1 study)</li> </ul> |

| Outcomes   | Evidence on Association Between WIC Participation and Outcomes   | Insufficient Evidence Despite One or More Studies  |
|--|--|--|
| Child growth anthropometric status (KQ2)         | NA   | <ul style="list-style-type: none"> <li>Child weight status (1 child study)</li> <li>Attained weight, length, or head circumference (1 maternal study, 1 child study)</li> </ul>  |
| Breastfeeding outcomes (KQ1 & KQ2)               | <p><b>Likely to be associated (Moderate SOE)</b></p> <ul style="list-style-type: none"> <li>No difference in breastfeeding initiation (6 studies)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>No difference in introduction of solids before 4 months (1 study)</li> </ul>   | <ul style="list-style-type: none"> <li>Breastfeeding duration (2 studies)</li> <li>Breastfeeding exclusivity (1 study)</li> </ul>  |
| Child dietary outcomes (KQ2)                     | <p><b>Likely to be associated (Moderate SOE)</b></p> <ul style="list-style-type: none"> <li>Child better diet quality measured by the Healthy Eating Index 2010 (2 studies)</li> <li>Child higher food group intake of 100% fruit juice, whole grain cereals, and age-appropriate shifts from whole milk to lower fat milk (4 studies)</li> <li>Household purchasing of healthy food groups and reduced purchasing of less healthy foods and beverages (6 studies)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>Child higher nutrient intakes of vitamin D and iron, and after age 2, meeting recommendations to limit saturated fat (2 studies)</li> </ul> | <ul style="list-style-type: none"> <li>Child diet quality measured by the Toddler Diet Quality Index (1 study)</li> <li>Child vegetable and fruit intakes (5 studies)</li> <li>Diet quality, food group intake, and nutrient intakes of women in WIC households (1 study)</li> </ul>     |
| Child development and academic achievement (KQ2) | <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>Maternal participation and better child cognitive development (2 studies)</li> <li>No difference in child communication and adaptive behavior (1 maternal study)</li> <li>No difference in measures of child social development (1 maternal study)</li> </ul>   | <ul style="list-style-type: none"> <li>Child participation and cognitive development (2 studies), social development (1 study), motor development (1 study), communication and adaptive behavior (2 studies), developmental risk (1 study), or academic achievement (1 study)</li> </ul> |

KQ= Key Question; NICU = neonatal intensive care unit; NA = not applicable; SOE = Strength of evidence; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Moderate SOE indicates moderate confidence that the estimated association lies close to the true association, low SOE indicates limited confidence that the estimated association lies close to the true association, and insufficient SOE indicates that evidence is unavailable or does not permit a conclusion.

## Strengths and Limitations

This is the first recent systematic review to assess the association of WIC participation with such a wide range of maternal and child outcomes. We also considered evidence on how outcomes were associated with the 2009 WIC food package change. The evidence spans most of the United States and uses data from federal and state surveillance systems, vital statistics, federal studies, and investigator-initiated studies. None of the evidence came from randomized trials, and this led to no findings of high SOE. The review focused mainly on studies having a comparison group with WIC-eligible non-participants. The studies used covariate adjustment and many used innovative design or analytic methods to reduce risk of bias. In general, WIC participation was self-reported with little detail about benefit issuance or duration of participation. We did not use meta-analysis because of the heterogeneity of study designs, populations, comparisons, and outcome measures. For many outcomes, few studies were identified. None of the studies reported on maternal mortality, maternal anemia, or food security, and insufficient SOE was found for many outcomes. Few studies addressed whether the association of WIC participation with outcomes that varied by maternal age, race/ethnicity, geographic location, education, employment status, marital status, or housing.

## **Implications and Conclusions**

Maternal WIC participation was associated with improved birth outcomes, lower infant mortality, and higher child cognitive development. WIC participation also was associated with improved diet quality for children and women during pregnancy, and with household purchases of quality food groups suggesting improved dietary patterns. No association was seen between maternal WIC participation and breastfeeding initiation. The evidence was insufficient regarding WIC participation and child overweight or obesity. For federal and state policy makers, the review summarizes current evidence on the role of WIC in improving outcomes and could help to inform decisions about potential changes in WIC. The review also highlights gaps which require new studies with strong designs to enhance the rigor of evidence on the spectrum of maternal health outcomes associated with maternal WIC participation; WIC participation and food security; child WIC participation and high weight status; and maternal or child WIC participation and child development and academic achievement.

# Introduction

## The WIC Program

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was established in 1974 to safeguard the health of low-income women, infants, and children younger than five years of age who are at nutritional risk, by providing nutritious supplemental foods, nutrition education, breastfeeding support, and referrals to other health and social service programs. WIC is administered by the United States Department of Agriculture (USDA) Food and Nutrition Service (FNS) through 89 state agencies and, in 2020, provided benefits to 6.2 million people.<sup>1</sup>

To be eligible for WIC, a woman must be pregnant or postpartum and meet income requirements. Women who are postpartum are eligible for up to 12 months if they are breastfeeding and 6 months if they are not breastfeeding. Infants (< 12 months of age) and children 1 to 4 years of age are also eligible. Applicants must be considered “at nutritional risk”<sup>2</sup> and have household income less than or equal to 185 percent of the Federal Poverty Guidelines issued annually by the United States Department of Health and Human Services. Applicants may also be adjunctively income-eligible for WIC if they participate in Medicaid, the Supplemental Nutrition Assistance Program (SNAP), or Temporary Assistance for Needy Families (TANF). Applicants must live in the state or territory in which they apply or meet residency requirements established by an Indian Tribal Organization (ITO). In 2018, 11.9 million people in the United States were estimated to be eligible to receive WIC benefits; program coverage (those receiving benefits of those eligible) was 53 percent for pregnant women, 84 percent for postpartum women, and 98 percent for infants. Coverage for children declined with their age (61%, 48%, 41% and 27%, respectively, for children 1, 2, 3 and 4 years of age).<sup>3</sup> Given the current reach of the WIC program and the even larger pool of eligible women and children, it is important to understand the current impact of participation on outcomes for women and children.

## Evaluations of WIC

Since its inception in 1974, the WIC Program has evolved to better and more efficiently address program goals and maintain consistency with the latest health and nutritional guidelines (Figure 1). WIC has been the subject of numerous studies of its impact on maternal and child outcomes. In 2004, USDA published a review of the effectiveness of WIC, as one of several federal assistance programs, and included published studies from the 1970s through 2002.<sup>4</sup> A second review, published by USDA in 2012, included published studies from 2002 to 2010 and unpublished studies from 1999 to 2002, while also explicitly evaluating the quality of the evidence.<sup>5</sup> That second review found evidence that WIC participation was associated with improved birth outcomes and child diet quality. The review identified weaker quality evidence, subject to selection bias, suggesting that WIC participation may be associated with a lower likelihood of breastfeeding. It described mixed findings on infant or child anthropometric outcomes (e.g., weight-for age, length-for-age, overweight, failure-to-thrive). The 2012 review also found that no clear conclusions could be drawn with respect to other child health and development outcomes.

The 2012 review explicitly focused on evaluation of outcomes for a period of time prior to the 2009 change in the WIC food package (hereafter referred to as the 2009 food package change).<sup>5</sup> The 2009 food package change was the first major change in the WIC food package

and was designed to strengthen promotion and support of breastfeeding, improved diet quality, and child obesity prevention.<sup>6</sup> The 2009 food package change aligned with recommendations from the Institute of Medicine (IOM) 2006 review of the WIC food package,<sup>7</sup> the American Academy of Pediatrics (AAP) recommendations regarding infant feeding,<sup>8</sup> and the 2005 Dietary Guidelines for Americans (DGA)<sup>9</sup> for chronic disease prevention. The revised food package included several changes not previously available: 1) added fruits and infant food meats, vegetables, whole grains, a switch to low-fat milk (at age 2 years), and reductions in the amount of 100 percent juice; 2) adjusted amounts of infant formula by proportion of human milk provided by breastfeeding to infants; and 3) changes in package provisions for postpartum women by breastfeeding status, with fully breastfeeding (i.e., no infant formula) mothers receiving the largest package, in terms of quantity and variety. Since 2009, new studies have evalu

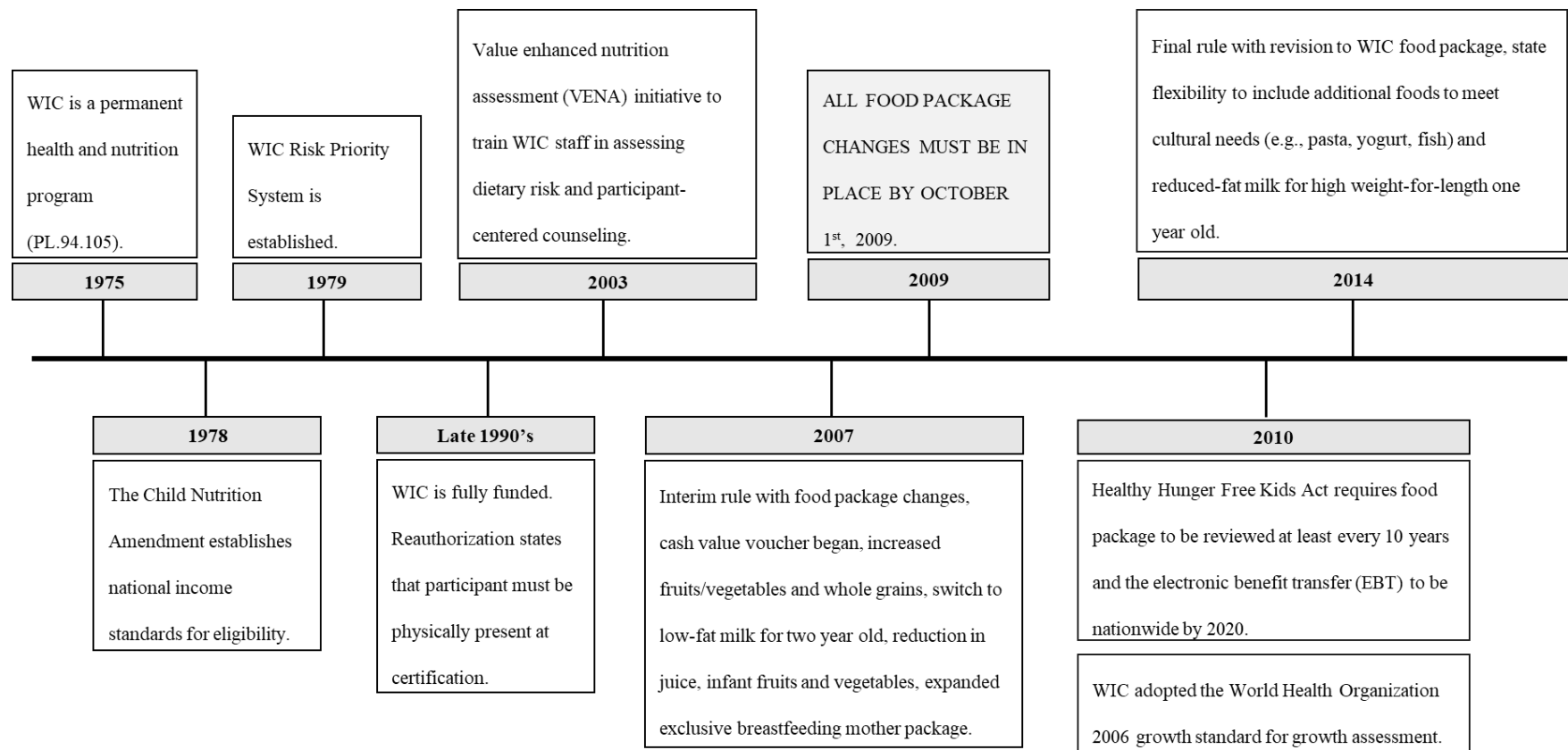
ated outcomes for women, infants, and children associated with WIC participation and have also compared differences in outcomes before versus after the 2009 food package change that were not included in the 2012 review.

In 2020, the DGA, 2020–2025 was released and included new guidelines for nutritional intake for women during pregnancy and lactation, and children from birth to 24 months of age.<sup>10</sup> The Healthy Hunger Free Kids Act of 2010 stipulated that the food package be reviewed every 10 years.<sup>11</sup> It is thus time to re-evaluate the evidence regarding WIC participation and the revised food package. Healthcare professionals, WIC and other public health practitioners, the research community, and WIC participants need reliable information about the effectiveness of WIC. Also, policymakers at the state and federal levels need such information to determine whether changes should be made in WIC programming to further improve dietary and health outcomes for women, infants, and children.

## **Purpose and Scope of the Systematic Review**

We synthesized recent evidence on whether WIC participation is associated with outcomes for women and children. This review also aims to describe the study designs and data sources used to evaluate maternal and child outcomes associated with WIC participation (including studies evaluating the 2009 food package change), evaluate the quality of evidence provided by these studies, and examine how studies characterized participation of women and/or children in WIC. In addition, the systematic review also seeks to identify evidence regarding dose or duration of participation, and differences in outcomes for sub-groups of women and children (e.g., age, race, and ethnicity). Lastly, the review identifies evidence gaps to be addressed in future research.

**Figure 1. WIC timeline with selected key program changes**



EBT = electronic benefit transfer; PL = Public Law; VENA = value enhanced nutrition assessment; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

# Methods

## Review Approach

We followed the methods outlined in the Agency for Healthcare Research and Quality (AHRQ) Methods Guide for Effectiveness and Comparative Effectiveness Reviews. This systematic review also reports on the methods and results in accordance with the Preferred Items for Reporting in Systematic Reviews and Meta-Analyses (PRISMA).<sup>12</sup>

The Key Questions for this systematic review were developed by the U.S. Department of Agriculture Food and Nutrition Service (USDA FNS) in consultation with AHRQ. We recruited a Technical Expert Panel (TEP) to review the protocol. The TEP included experts in nutrition and primary care and representatives of the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and government organizations. With feedback from the TEP, USDA, and AHRQ, we finalized the protocol and posted it on the AHRQ Effective Health Care Program's website ([www.effectivehealthcare.ahrq.gov](http://www.effectivehealthcare.ahrq.gov)) and registered with the PROSPERO registry (CRD42020222452).

## Key Questions

Key Question 1: Among women who are eligible to participate in WIC, how is WIC participation during pregnancy associated with maternal and infant birth outcomes?

- a. Does the association of maternal and infant outcomes with WIC vary by gestational age at WIC enrollment or duration of the mother's WIC participation?
- b. Does the association of maternal and infant health outcomes with WIC vary by participant factors such as age of the mother at delivery, race/ethnicity of mother, geographic location (e.g., region, urban vs. rural), education of the mother, employment status of the mother, marital status, or housing (e.g., public, homeless)?

Key Question 2: Among infants and children eligible to participate in WIC, how is WIC participation associated with dietary and health outcomes in childhood?

- a. Does the association of infant and child outcomes with WIC vary by age at enrollment or duration of WIC participation?
- b. Does the association of infant and child outcomes with WIC vary by participant factors such as age of the mother at delivery, race/ethnicity of mother, geographic location (e.g., region, urban vs. rural), education of the mother, employment status of the mother, marital status, or housing (e.g., public, homeless)?



## Analytic Framework

Figure 2 displays the analytic framework we used to address the Key Questions. The WIC program provides supplemental foods, nutrition education, breastfeeding support, referrals to health and social services, and enhanced care for those identified for high-risk nutrition care. Through these service provisions, WIC may increase knowledge and improve attitudes toward health behaviors, improve maternal and child utilization of healthcare and social services, and increase access to nutritious foods. It is through these pathways that WIC participation may be associated with improved nutrition and health of women and children.

WIC is a federal program administered in accordance with federal regulations, and causal evidence of its impact through randomized controlled trials is not possible because eligible individuals cannot be excluded from the program for research purposes. Thus, direct evidence on whether WIC participation is associated with outcomes comes from comparisons of WIC participants with WIC-eligible non-participants. Because eligible individuals may or may not choose to participate, selection bias should be addressed. The reasons given for individual participation and the duration of that participation are complex and only partially understood.<sup>13-16</sup>

In general, research suggests that WIC participation and retention are associated with greater disadvantage and food insecurity (compared to those who are WIC-eligible but do not participate in the program), although some evidence suggests that breastfeeding and the perception of being helped by WIC are each associated specifically with longer retention of children in WIC.<sup>13-16</sup> What this means is that observational studies are likely to be negatively biased (more likely to have worse outcomes associated with WIC participation or less likely to demonstrate a benefit with WIC participation) if they do not either perform adequate adjustment for confounding or use approaches to enhance causal inference (e.g., matching, propensity scoring, regression discontinuity, instrumental variable, within-mother across siblings).

To compare outcomes of WIC participants with eligible non-WIC participants, researchers must define a WIC-eligible population, such as those who participated in Medicaid or the Supplemental Nutrition Assistance Program (SNAP) and are thus eligible for WIC (through adjunctive eligibility). The income eligibility criterion for these programs is more restrictive (less than 130% of the federal poverty level versus less than 185% of the federal poverty level). Thus, such studies of WIC participation exclude individuals with higher incomes who are eligible for WIC but not Medicaid or SNAP. Over time, Medicaid expansion has increased the number of pregnant women eligible for WIC (through adjunctive eligibility), which has changed the income and other characteristics of prenatal WIC participants and WIC-eligible non-participants. As a result, the associations of maternal WIC participation with maternal and neonatal birth outcomes, as well as child outcomes, may have also changed. This expansion has also likely resulted in a greater inclusion of individuals across the range of income levels eligible for WIC (less selection bias for those with lowest incomes). In addition, Medicaid and SNAP are generally restricted to U.S. citizens and permanent residents, and this approach will exclude information on outcomes of undocumented individuals from the evidence base.

The 2009 food package change was a key program change (Figure 1) and given that nutritional improvement is a core pathway to improved health outcomes for the woman and child, studies conducted prior to 2009 or without data since 2009 do not contribute best evidence toward our understanding of the current WIC program and what it means for participants. That said, the 2009 food package change provided a natural experiment for evaluating outcomes by WIC participation across time periods with different food packages. The goal of these types of studies was not to compare the food packages per se, but to evaluate WIC participation under the

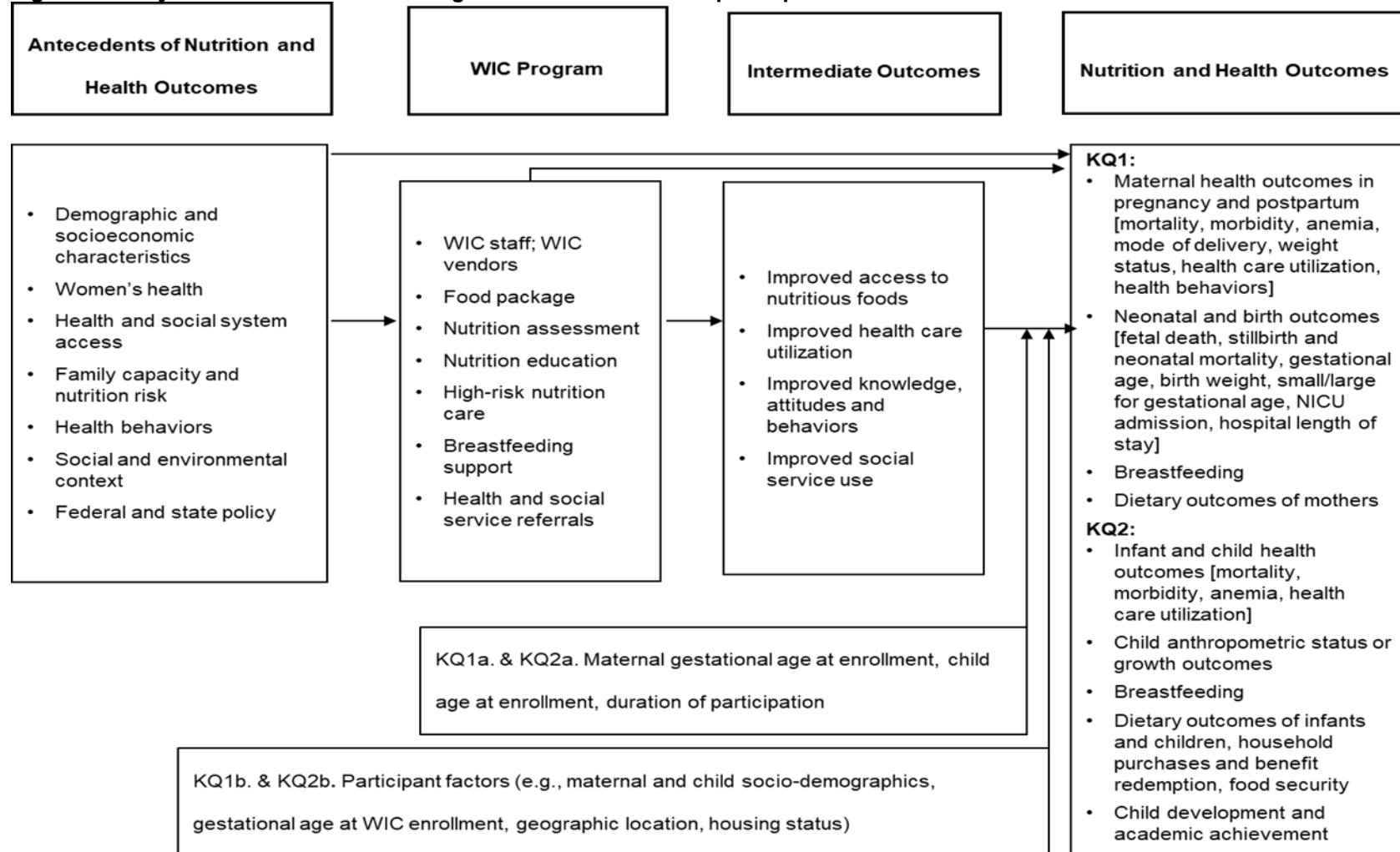
revised food package, adjusting for prior differences under the pre-2009 food package. Thus, studies that use difference in difference designs (and covariate adjustment) can provide direct evidence regarding the association between WIC participation and maternal and child outcomes. Studies may also compare outcomes before and after the 2009 food package change only among WIC participants. With appropriate covariate adjustment and matching or propensity scoring to address changes in the WIC population over time, studies evaluating outcomes associated with 2009 food package change in WIC participants can provide indirect evidence regarding the association between WIC participation and outcomes.

## Study Selection

We searched PubMed<sup>®</sup>, Embase<sup>®</sup>, CINAHL<sup>®</sup>, ERIC, SCOPUS, PsycINFO<sup>®</sup>, and the Cochrane Central Register of Controlled Trials. We conducted two literature searches: one from January 2009 through September 2021 and the other, a targeted search for selected outcomes (infant mortality, maternal mortality, and child development and academic achievement), from January 2000 through September 2021. We extended the search for studies on the latter back to 2000 because the non-dietary outcomes were thought to be less impacted by the 2009 food package change and may not have been reported in many recent studies. We based study selection on the PICOTS framework (populations, interventions, comparators, outcomes, timing, and settings) detailed in Table 1. We provided full details on the search strategy in Appendix A and a list of the excluded studies in Appendix B. We included both quantitative and qualitative studies. We considered qualitative studies that provided insights about the association of WIC with outcomes in Table 1. We hand-searched the lists of references of relevant systematic reviews and reports. We searched the grey literature for unpublished studies relevant to this review that met the inclusion criteria.

The results of the literature search are in Appendix C. As part of the grey literature search, AHRQ posted a Federal Register Notice requesting submission of relevant information using a Supplemental Evidence and Data for Systematic Review portal.<sup>17</sup> Searches were updated for new studies while the draft report was posted for public comment. Studies identified during the updated search were also assessed using the process described above and have been incorporated in this report.

**Figure 2. Analytic framework for assessing the association of WIC participation with maternal and child outcomes**



KQ = Key Question; NICU = neonatal intensive care unit; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

**Table 1. PICOTS (populations, interventions, comparisons, outcomes, timing, and setting) inclusion and exclusion criteria**

| <b>PICOTS Elements</b> | <b>KQ1 Inclusion</b>  | <b>KQ2 Inclusion</b>  | <b>KQ1 and KQ2 Exclusion</b>                                    |
|------------------------|---|---|---|
| <b>Population</b>      | <p><b>Women</b> who participated in WIC during pregnancy and their infants from birth to 28 days</p> <p><b>Participant factors include</b> age of mother at delivery, race/ethnicity of mother, geographic location, education of mother, employment status of mother, marital status of mother, housing, parity, and maternal nutritional status at enrollment</p> | <p><b>Infants/children</b> who participated in WIC (ages from 29 days up to 5 years)</p> <p><b>Participant factors include</b> age of mother at delivery, race/ethnicity of child (or mother), geographic location, education of mother, employment status of mother, marital status of mother, housing, parity of mother, and maternal and/or child nutritional status at enrollment</p> | No population of interest                                       |
| <b>Intervention</b>    | Participation in WIC with service provisions (food package) from 2009 onwards, defined at a minimum as enrolling in WIC for one month or more <sup>a</sup>  | Participation in WIC with service provisions (food package) from 2009 onwards, defined at a minimum as enrolling in WIC for one month or more   | No intervention of interest                                     |
| <b>Comparison</b>      | <b>Women who were eligible</b> for WIC but did not participate during pregnancy and their infants from birth to 28 days; duration of WIC participation; exposure to pre-2009 service provisions (food package)  | <b>Infants/children who were eligible</b> for WIC but did not participate at the age studied (ages from 29 days up to 5 years); duration of WIC participation; exposure to pre-2009 service provisions (food package)   | Quantitative studies that do not report on the comparison group |

| PICOTS Elements             | KQ1 Inclusion   | KQ2 Inclusion   | KQ1 and KQ2 Exclusion                                      |
|-----------------------------|---|---|--|
| <b>Outcomes<sup>b</sup></b> | <ul style="list-style-type: none"> <li>• <b>Maternal health outcomes (health risk) in pregnancy and postpartum:</b> mortality, morbidity, anemia, mode of delivery, weight status, healthcare utilization, health behaviors</li> <li>• <b>Neonatal and birth outcomes:</b> fetal death, stillbirth and neonatal mortality, gestational age, birth weight, small/large for gestational age, NICU admission, hospital length of stay</li> <li>• <b>Breastfeeding</b></li> <li>• <b>Dietary outcomes:</b> Dietary practices of mothers, diet quality, household food security</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Infant and child health outcomes:</b> mortality, morbidity, anemia, healthcare utilization</li> <li>• <b>Child anthropometric status or growth outcomes:</b> weight-for-age, length- or height-for-age, weight-for-length, or weight-for-height percentile or Z-score, BMI-for-age percentile or Z-score, underweight, obesity, growth velocity</li> <li>• <b>Breastfeeding</b></li> <li>• <b>Dietary outcomes:</b> Dietary practices of infants and children, diet quality, household and child food security, food purchasing behavior at the participant or household level</li> <li>• <b>Child development and academic achievement:</b> cognitive development, social development, motor development, communication and adaptive behavior, development risk, academic achievement</li> </ul> | Studies that do not report any of the outcomes of interest |
| <b>Timing<sup>c</sup></b>   | <ul style="list-style-type: none"> <li>• Studies used data 2009 onwards</li> <li>• Studies published since 2009 that compare results before and after 2009 food package change</li> </ul>   | <ul style="list-style-type: none"> <li>• Studies used data 2009 onwards</li> <li>• Studies published since 2009 that compare results before and after 2009 food package change</li> </ul>   | Studies without data since 2009 except as noted            |
| <b>Setting</b>              | Any jurisdiction served by a WIC state or local agency  | Any jurisdiction served by a WIC state or local agency  | No jurisdiction served by a WIC state or local agency      |

| PICOTS Elements          | KQ1 Inclusion  | KQ2 Inclusion   | KQ1 and KQ2 Exclusion   |
|--------------------------|--|---|---|
| <b>Study design/type</b> | Intervention trials (randomized and non-randomized), observational studies, quasi-experimental (e.g., before-after, interrupted time series), regression discontinuity approaches, qualitative studies | Intervention trials (randomized and non-randomized), observational studies, quasi-experimental (e.g., before-after, interrupted time series), qualitative studies | <ul style="list-style-type: none"> <li>• Studies published before 2009 or no data since 2009 for all the outcomes except maternal mortality, infant mortality, child development/school performance</li> <li>• Publications with no original data (e.g., editorials, letters, comments, reviews)</li> <li>• Full text not presented or unavailable, abstracts only</li> <li>• WIC program materials, brochures, and training manuals</li> <li>• Descriptions of WIC participation levels and participant characteristics without outcome data</li> <li>• Studies presenting only unadjusted comparisons</li> <li>• Descriptive research on WIC implementation, operations, and program costs</li> <li>• <b>Qualitative studies</b> of barriers/facilitators related to WIC participation but not linked to outcome</li> </ul> |

BMI = body mass index; KQ = Key Question; NICU = neonatal intensive care unit; WIC=Special Supplemental Nutrition Program for Women, Infants and Children.

<sup>a</sup>Reviewers relied on how WIC participation was reported in the studies even though WIC defines participation as being enrolled and receiving food benefits;

<sup>b</sup>See Appendix A for a detailed list of outcomes

<sup>c</sup>Studies not using data collected after 2009 were included for specific key outcomes (maternal mortality, infant mortality, child development and academic achievement).

## Data Extraction and Risk of Bias Assessment

We created and pilot tested standardized forms for data extraction. We formed reviewer pairs to include personnel with both topic and methodological expertise. One reviewer completed the data abstraction, and a second reviewer checked the first reviewer's abstraction for completeness and accuracy. We resolved differences through discussion and as needed through consensus among our team. Reviewers extracted information on study characteristics, the WIC program (e.g., national, state, local agencies), participant characteristics, eligibility (with respect to WIC exposure for intervention and comparison), and results of each outcome. We also extracted results from qualitative studies that described WIC participant or staff perceptions/experiences that may have been linked to specific participant characteristics (for Key Question 1a/b and Key Question 2a/b) or an outcome of interest, with the goal of providing context for the quantitative findings. For these studies, we extracted information on: a) perceptions of the 2009 food package change and its relationship with the outcomes; and b) perceptions of WIC services for subgroups of participants and explorations of how WIC might lead to differential impacts, specifically related to Key Question 1a/b and Key Question 2a/b.

Two reviewers independently assessed risk of bias for individual studies. Differences between reviewers were resolved through consensus. We used the EPHPP (Effective Public Health Practice Project) tool to assess the risk of bias in quantitative studies addressing our outcomes of interest.<sup>18</sup> We selected the EPHPP tool because it was specifically developed for

evaluating public health policies and programs (like WIC), has good inter-rater agreement, and addressed domains common to other risk of bias tools.<sup>18</sup> We created a summary assessment of “overall risk of bias” for each study by grouping the domains included in the tool. The domains included assessment of study selection bias, adjustment for confounders, data collection methods, withdrawals, and drop-outs. We accepted any analytic approach to addressing confounding through study design, sample selection, or covariate adjustment. The number and type of covariates available for adjustment depended on the data source, and the outcome and study design. To be eligible for inclusion, studies had to adjust for household income if income level was not restricted through sampling. Otherwise, we included studies that reported an analysis adjusting for one or more key covariates such as maternal age, parity, race, ethnicity, education [mother/caregiver], and age and sex of infant/child. General descriptions of covariates by outcome are presented in Appendix C, Table C-4. For qualitative studies, reviewers assessed study quality using the Joanna Briggs Institute Checklist.<sup>19</sup> See Appendix C, Table C-6 for details on the data extraction.

## **Data Synthesis and Analysis**

We presented results by the Key Questions and outcomes. We conducted descriptive synthesis for each Key Question. Evidence Tables show detailed study characteristics and results, and summary tables highlight the main findings. We narratively summarized results from qualitative studies that described WIC participant or staff perceptions/experiences that were linked to specific participant characteristics or an outcome. Missing data was recorded as “not reported.” To determine whether meta-analyses were appropriate, we considered whether studies were adequately homogenous with respect to key variables (population characteristics, intervention, comparison, outcome measures, study design, duration, data source). Meta-analyses were deemed not appropriate for all comparisons and outcomes owing to the small number of studies reporting for each comparison and outcome category and heterogeneity in the studies’ measures of the exposure and outcomes. Studies generally did not report enough data to support calculation of standardized mean differences or data conversion.

## **Minimal Clinically Important Difference**

In evaluating WIC, a social safety net program, we considered the “important difference” at a population or policy level in addition to the difference at an individual clinical level. A difference that is very small at the clinical level can be associated with meaningful impact in a large population. When warranted, based on the evidence, we sought to identify appropriate reference points for the magnitude of effect from subject matter experts, statistical rationale (proportion of a standard deviation), evaluations of public health, safety net or prenatal care programs, and cost-benefit analyses.

## **Grading the Strength of the Body of Evidence**

After synthesizing the evidence, we graded the strength of evidence (SOE) from the quantitative studies using the grading scheme recommended by the AHRQ Methods Guide for Conducting Comparative Effectiveness Reviews.<sup>20</sup> We applied evidence grades to the bodies of evidence about each comparison for each outcome. In assigning evidence grades, we considered four recommended domains, including study limitations (includes study design and ratings of risk of bias), directness of the evidence, consistency across studies, and precision of any estimates of effect. We did not formally assess the domain of reporting bias because of the lack of reliable methods for identifying reporting bias in observational studies. We assigned the final

SOE grade by evaluating and qualitatively considering the assessments of the above domains and the overall assessment of the results across studies. We classified the SOE into four categories: high, moderate, low, and insufficient (Table 2).

We considered each SOE domain qualitatively across a continuum, even though the individual domains were reported categorically. Therefore, the final SOE for two outcomes could be different despite them having similar categorization of the individual domains. Although a greater number of studies contributing evidence for an outcome may lead to higher grade, the grade depends heavily on the quality of the studies.

**Table 2. Definitions of the grades of overall strength of evidence**

| <b>Grade</b> | <b>Definition</b>   |
|--------------|---|
| High         | We are very confident that the estimate of effect lies close to the true effect for this outcome. The body of evidence has few or no deficiencies. We believe that the findings are stable (i.e., another study would not change the conclusions).  |
| Moderate     | We are moderately confident that the estimate of effect lies close to the true effect for this outcome. The body of evidence has some deficiencies. We believe that the findings are likely to be stable, but some doubt remains.   |
| Low          | We have limited confidence that the estimate of effect lies close to the true effect for this outcome. The body of evidence has major or numerous deficiencies (or both). We believe that additional evidence is needed before concluding either that the findings are stable or that the estimate of effect is close to the true effect. |
| Insufficient | We have no evidence, we are unable to estimate an effect, or we have no confidence in the estimate of effect for this outcome. No evidence is available, or the body of evidence has unacceptable deficiencies, precluding reaching a conclusion.   |



## Results

We begin by describing the results of the literature searches. We then provide an overall description of included studies. The remainder of the chapter is organized by Key Question and outcomes. For each outcome, the direct evidence regarding participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is presented by a list of key points, summary table, and synthesis of evidence. Where applicable, the presentation also includes a summary table and synthesis of the indirect evidence regarding WIC participation from studies examining the impact of the 2009 food package change among WIC participants. We synthesized the quantitative and qualitative studies separately by outcomes. The presentation of results follows from the PICOTS (populations, interventions, comparisons, outcomes, timing, and setting) table with three exceptions (Table 1). First, because breastfeeding represents an outcome for both the mother and child and is associated with both maternal and child WIC participation, we present the breastfeeding results together and placed them in the Key Question 2 section. Second, studies assessing maternal dietary intake included studies of women during pregnancy, and studies of women who were identified as caregivers of children in WIC. Therefore, the dietary outcome results of women who were direct beneficiaries during pregnancy and postpartum are presented in Key Question 1, and studies of maternal dietary intake associated with child WIC participation are summarized in Key Question 2. Third, although in the PICOTS table we considered food purchasing and redemption outcomes for both Key Question 1 and Key Question 2, the studies of purchasing and benefit redemption outcomes focus on the household. Because households are most likely to participate in WIC because of children, we presented these findings as part of Key Question 2. Detailed evidence tables (study characteristics, eligibility criteria, and relevant outcomes) and study quality assessments are available in Appendix C and Appendix D.

### Results of the Literature Search

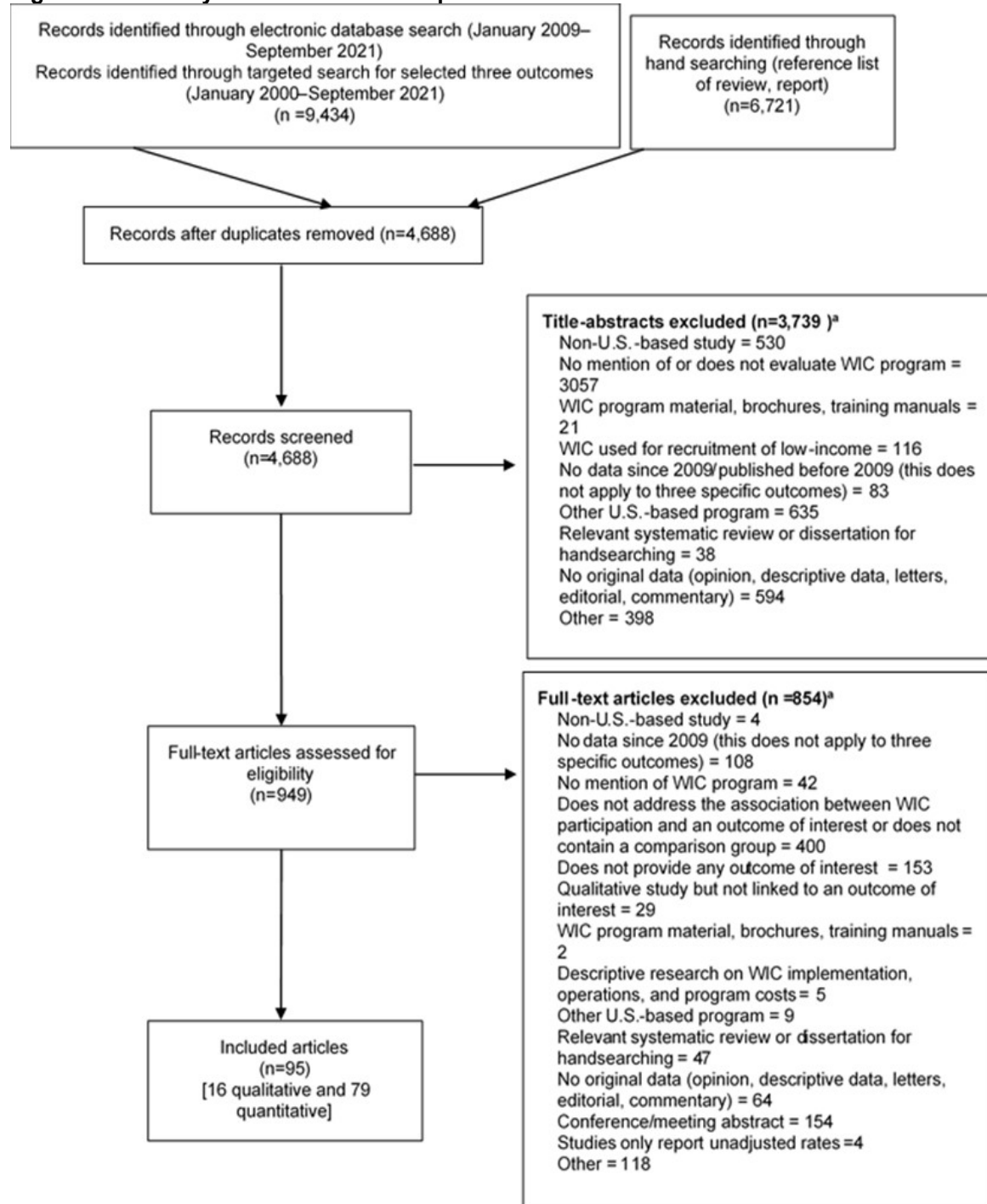
The results of the published literature search are summarized in Figure 3. Combining all the database searches and hand searching yielded 4,688 unique citations. The title and abstract screening excluded 3,739 citations, and the article screening excluded 854 citations (Appendix B). Ninety-five published studies met our inclusion criteria. Manual searching of the grey literature identified three reports on the association of WIC participation and child outcomes.<sup>21-23</sup> Thus, 98 studies were included. The Federal Register notice requesting supplemental evidence did not yield any other studies.

### Description of Included Studies

Of the included studies, 16 were qualitative studies, 79 were quantitative studies, and 3 were reports with quantitative or qualitative data from the grey literature. Despite the large number of studies and the fact that studies may report on more than one outcome, the number of quantitative studies per outcome is often small, and the qualitative studies largely focused on breastfeeding, dietary outcomes, and food purchasing outcomes (Table 3). The quantitative studies were also classified as to whether they provided direct or indirect evidence regarding WIC participation and the outcome. Forty-nine quantitative studies provided direct evidence regarding WIC participation and outcomes and 34 quantitative studies provided indirect evidence based on evaluation of the 2009 food package change among WIC participants (1 study provided both direct and indirect evidence). Figures 4 through 7 characterize quantitative studies by data

collection period, type of evidence, and outcome. As shown, the data collection period for the included studies ended prior to the COVID-19 pandemic.

**Figure 3. Summary of the results of the published literature search**



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

<sup>a</sup>Total exceeds the number of citations in the exclusion box, because citations could be excluded for more than one reason (i.e., reviewers did not need to agree on reason for exclusion.)

**Table 3. List of included studies by Key Question<sup>a</sup>**

| Key Question   | Quantitative Studies: Direct Evidence <sup>b</sup> | Quantitative Studies: Indirect Evidence <sup>c</sup> | Qualitative Studies |
|--|--|--|---------------------|
| <b>1 (including 1a and 1b)</b> -Maternal and neonatal and birth outcomes     | 11   | 2  | 3                   |
| <b>2 (including 2a and 2b)</b> -Infant and child dietary and health outcomes | 32   | 27   | 5                   |
| <b>1 &amp; 2</b><br>Maternal and infant breastfeeding outcomes               | 9  | 5  | 9                   |

<sup>a</sup>A study could address multiple outcomes, so the numbers shown do not add up to the total number of studies

<sup>b</sup>**Direct evidence** regarding WIC participation and the outcomes involves a comparison of outcomes for WIC participants versus WIC-eligible non-participants.

<sup>c</sup>**Indirect evidence** refers to studies of outcomes among WIC participants without comparison to WIC-eligible non-participants, including studies examining the impact of the 2009 food package change.

Included quantitative studies were observational. The overall risk of bias was high for 49 quantitative studies and moderate for 33 quantitative studies. The primary sources of bias in the studies were selection bias and inadequate adjustment for confounding, including that owing to secular trends. Sixty-eight studies received government, academic or nonprofit funding, four studies received private funding, and the remainder did not report any funding source. (See Appendix C, Table C-1.) Characteristics of the studies, participants, and interventions (WIC programs) are listed in Appendix D, Evidence Tables D-1 through D-29.

Most studies did not report details of the degree of WIC participation (e.g., duration, intensity). The most common description of WIC participation was self-reported on a questionnaire, without specification of duration or receipt of benefits. The comparison group of eligible non-participants was most often identified by participation in Medicaid or the Supplemental Nutrition Assistance Program (SNAP) or, less frequently, by identification of households with incomes less than 185 percent of the Federal Poverty Guidelines. Studies were excluded from the main analysis if the non-participant comparison was not WIC-eligible, or the studies did not provide evidence of substantial adjustment for socio-economic status (e.g., percent of the Federal Poverty Guidelines). For studies that included time periods before and after the 2009 food package change and included both WIC participants and eligible non-participants, we reported findings on the WIC versus non-WIC comparison.

Few studies addressed Key Question 1a/b or Key Question 2a/b. The included studies of duration are in Key Question 2 and focus on child diet and anthropometric outcomes. Included studies for Key Question 1b or Key Question 2b, regarding whether associations of WIC participation with the outcome varied by participant characteristics, most often focused on maternal race or race/ethnicity. Maternal race was reported differently across studies (e.g., Black or African-American), and many studies characterized mothers in terms of combined race and ethnicity categories (e.g., Black, White, or Hispanic as opposed to non-Hispanic Black, non-Hispanic White, or Hispanic). We maintained the reporting of the referenced paper.

| Domain                                     | Outcome  | Author, year        |     |
|--|--|---------------------|-----|
| Maternal health outcomes                   | Maternal mortality                             | No studies          |     |
|  | Maternal morbidity                             | Hamad, 2019         | IND |
|  | Maternal anemia                                | No studies          |     |
|  | Maternal gestational weight gain               | Sonchak, 2017       |     |
|  |  | Hamad, 2019         | IND |
|  | Maternal health behavior                       | Kasim, 2021         |     |
|  | Maternal healthcare utilization                | Baer, 2019          |     |
|  | Mode of delivery                               | No studies          |     |
| Neonatal and birth outcomes                | Fetal death, stillbirth and neonatal mortality | El-Bastawissi, 2007 |     |
|  |  | Fingar, 2017        |     |
|  |  | Angley, 2018        |     |
|  | Preterm birth                                  | Sonchak, 2016       |     |
|  |  | Fingar, 2017        |     |
|  |  | Hamad, 2019         | IND |
|  |  | Soneji, 2019        |     |
|  |  | Testa, 2020         |     |
|  | Infant low birth weight                        | Sonchak, 2016       |     |
|  |  | Fingar, 2017        |     |
|  |  | Hamad, 2019         | IND |
|  |  | Rhee, 2019          |     |
|  |  | Testa, 2020         |     |
| NICU admission and hospital length of stay | Sonchak, 2016                                  |                     |     |
|  | Hamad, 2019                                    | IND                 |     |

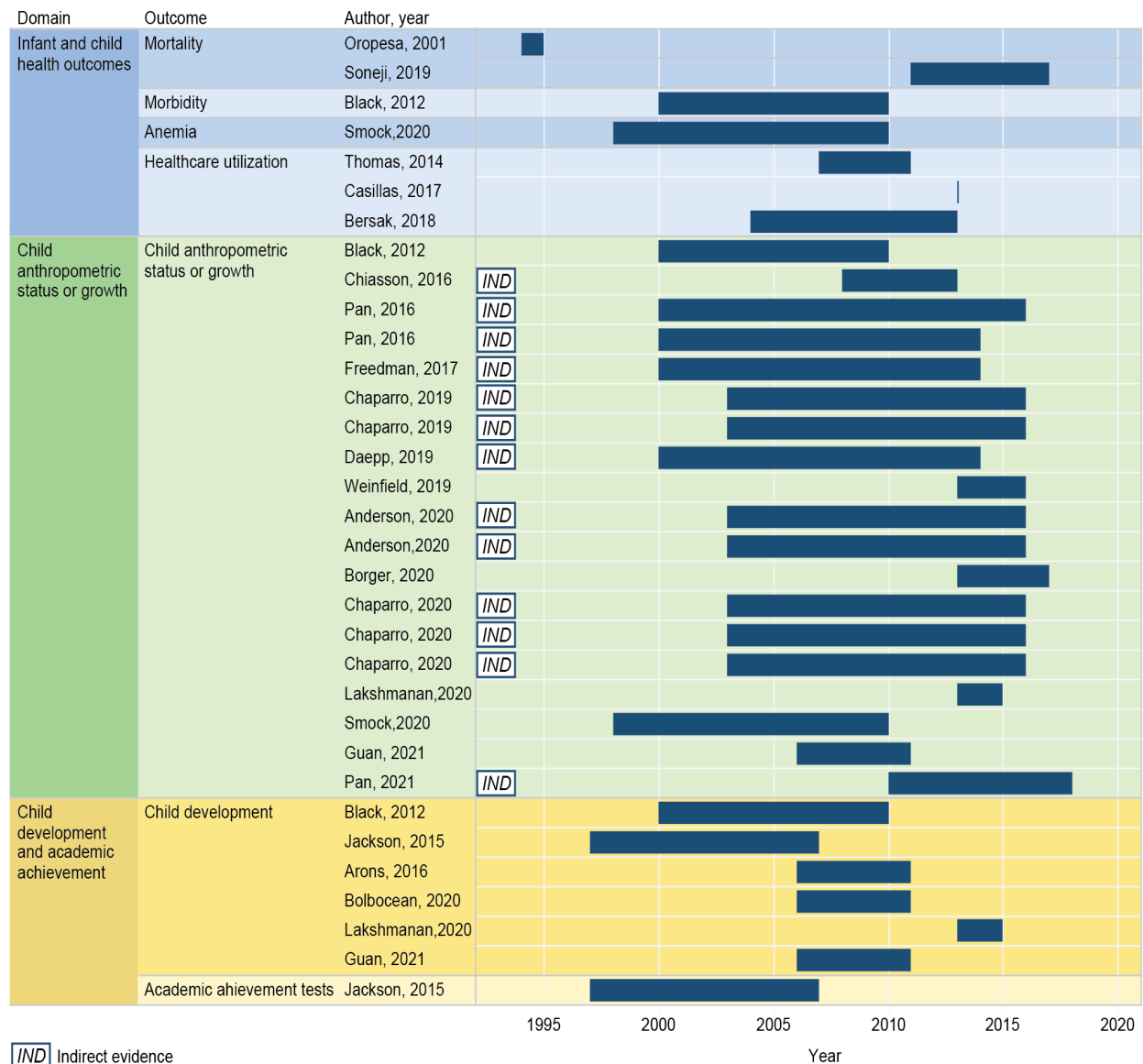
1995 2000 2005 2010 2015 2020

Year

IND Indirect evidence

Indirect evidence refers to studies of outcomes among WIC participants without comparison to WIC-eligible non-participants, including studies of the 2009 food package change

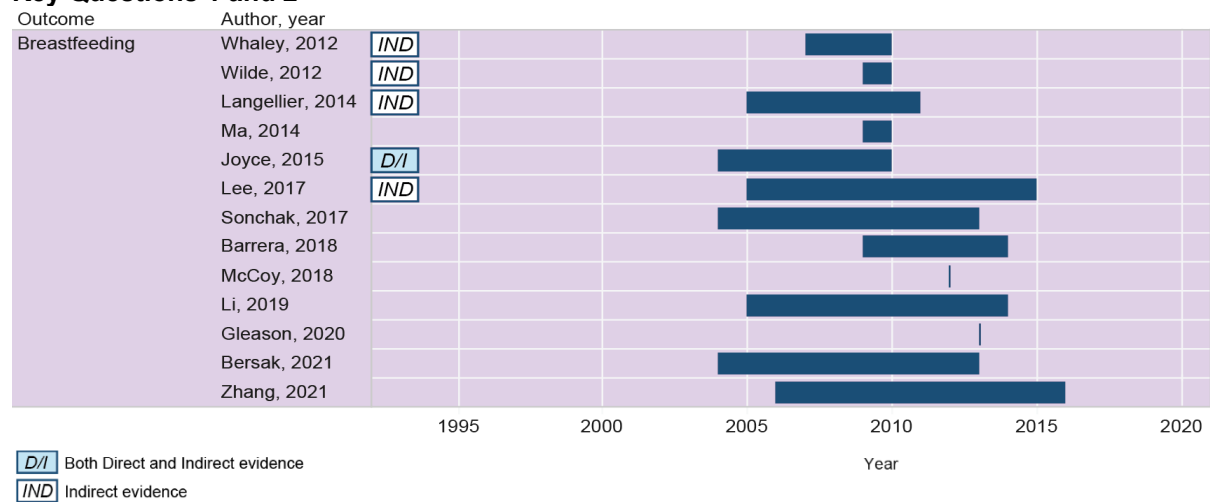
**Figure 5. Data collection periods of included quantitative studies on infant/child health, growth, and development outcomes (Key Question 2)**



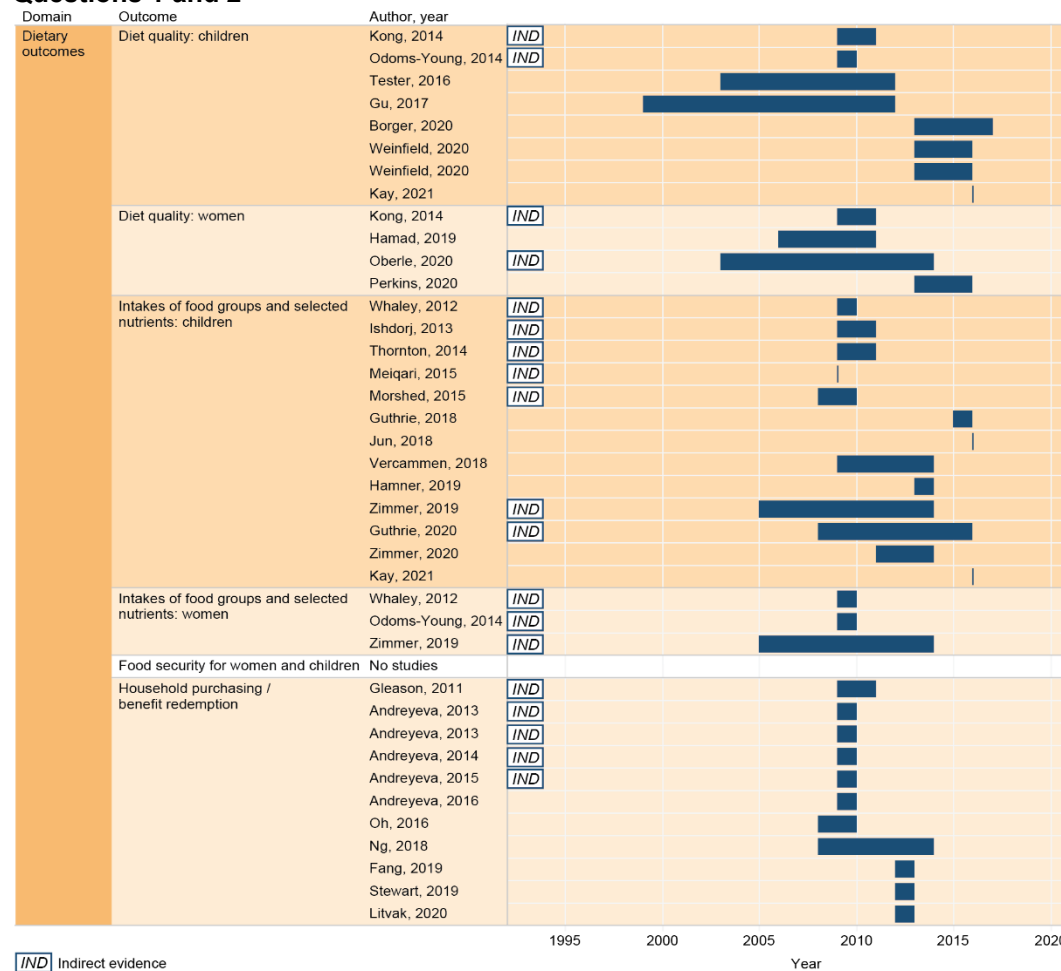
WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

Indirect evidence refers to studies of outcomes among WIC participants without comparison to WIC-eligible non-participants, including studies of the 2009 food package change

**Figure 6. Data collection periods of included quantitative studies on breastfeeding outcomes for Key Questions 1 and 2**



**Figure 7. Data collection periods of included quantitative studies on dietary outcomes for Key Questions 1 and 2**



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

Indirect evidence refers to studies of outcomes among WIC participants without comparison to WIC-eligible non-participants, including studies of the 2009 food package change

**Key Question 1:** Among women who are eligible to participate in WIC, how is WIC participation during pregnancy associated with maternal and infant birth outcomes?

## **Key Points**

### **Maternal Health Outcomes**

- Maternal WIC participation may be associated with a lower likelihood of inadequate gestational weight gain (strength of evidence [SOE]: Low).
- Maternal WIC participation may be associated with lower alcohol use in pregnancy, and no difference in smoking during or after pregnancy (SOE: Low).
- No eligible studies reported on whether maternal WIC participation was associated with the outcomes of maternal mortality, gestational diabetes, preeclampsia, gestational hypertension, anemia in pregnancy, mode of delivery, pre-pregnancy weight status or body mass index (BMI), or postpartum weight retention (SOE: Insufficient).

### **Neonatal and Birth Outcomes**

- Maternal WIC participation during pregnancy is likely to be associated with lower risk of preterm birth (SOE: Moderate).
- Maternal WIC participation during pregnancy is likely to be associated with lower risk of low birth weight in infants (SOE: Moderate).
- Maternal WIC participation during pregnancy may be associated with no difference in perinatal death overall (SOE: Low)
- The evidence was insufficient to determine whether maternal WIC participation was associated with risk of neonatal intensive care unit (NICU) stays (SOE: Insufficient).

### **Maternal Dietary Outcomes**

- WIC participation during pregnancy may be associated with better diet quality (SOE: Low).
- WIC participation during pregnancy may be associated with greater intakes of total fruit (SOE: Low).
- No eligible studies reported on associations of WIC participation during pregnancy with other specific nutrient intakes (SOE: Insufficient).

### **Maternal Health Outcomes**

Three studies reported on the association between WIC participation and maternal health outcomes. One single-state (South Carolina) cohort used birth certificate data to assess the outcome of gestational weight gain for WIC participation (vs. non-WIC participation) among Medicaid enrollees.<sup>24</sup> One national study reported on the association of WIC participation with smoking and alcohol use.<sup>25</sup> One large pre-post study used a difference in differences analysis to compare outcomes before and after the 2009 food package change for WIC recipients (vs. general population of non-WIC recipients)<sup>26</sup> and reported three maternal outcomes. Table 4 presents the summary of findings and SOE from the two studies that most directly addressed the question regarding WIC participation and maternal health outcomes. See Appendix D, Evidence Tables D-30 through D-36 for additional details.

**Table 4. Summary of evidence on whether maternal health outcomes were associated with WIC participation compared with eligible non-WIC participants**

| Outcome Category                       | Outcome                            | Number of Studies and Participants (N)   | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>   |
|--|------------------------------------|--|---|---|---|
| <b>Maternal mortality</b>              | Maternal mortality                 | 0 studies  | NA  | None  | Insufficient  |
| <b>Maternal morbidity</b>              | Gestational hypertension           | 0 studies  | NA  | None  | Insufficient  |
|  | Anemia in pregnancy                | 0 studies  | NA  | None  | Insufficient  |
|  | Preeclampsia                       | 0 studies  | NA  | None  | Insufficient  |
|  | Gestational diabetes               | 0 studies  | NA  | None  | Insufficient  |
| <b>Maternal pregnancy</b>              | Mode of delivery                   | 0 studies  | NA  | None  | Insufficient  |
|  | Gestational weight gain            | <ul style="list-style-type: none"> <li>1 cohort study among South Carolina births (275,482 mothers) 2004-13<sup>24</sup></li> </ul>            | <ul style="list-style-type: none"> <li>Using maternal fixed effects, WIC participation associated with a decreased likelihood of less than recommended weight gain (3%).</li> </ul>   | Maternal WIC participation may be associated with decreased likelihood of inadequate gestational weight gain. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul> |
|  | Pre-pregnancy weight status or BMI | 0 studies  | NA  | None  | Insufficient  |
|  | Postpartum weight retention        | 0 studies  | NA  | None  | Insufficient  |
|  |                                    |  |   |   |   |
| <b>Maternal health behavior</b>        | Smoking                            | <ul style="list-style-type: none"> <li>1 national cross-sectional study among approximately 230,000 mothers) 1992-2013<sup>25</sup></li> </ul> | <ul style="list-style-type: none"> <li>No statistically significant differences in smoking during pregnancy or postpartum by WIC participation among Medicaid enrollees.</li> </ul>   | Maternal WIC participation may be associated with no difference in smoking during or after pregnancy.         | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul> |
|  | Alcohol use                        | <ul style="list-style-type: none"> <li>1 national cross-sectional study among approximately 230,000 mothers) 1992-2013<sup>25</sup></li> </ul> | <ul style="list-style-type: none"> <li>WIC participation associated with a 22% lower probability of any alcohol use during pregnancy and a 3.8% lower probability of drinking &gt;1 alcoholic beverage during pregnancy.</li> </ul> | Maternal WIC participation may be associated with lower alcohol use in pregnancy.                             | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul> |
| <b>Maternal healthcare utilization</b> | Maternal health care utilization   | 0 studies  | NA  | None  | Insufficient  |

BMI = body mass index; NA = not applicable; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Low strength of evidence indicates limited confidence that the estimated association lies close to the true association; and insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion.



## **Maternal Mortality**

No eligible studies reported on the outcome of maternal mortality.

## **Maternal Morbidity (Preeclampsia, Gestational Diabetes, Gestational Hypertension, Anemia)**

No eligible studies reported on the adjusted association between WIC participation and maternal morbidity including preeclampsia, gestational diabetes, gestational hypertension, or anemia in pregnancy.

## **Maternal Pregnancy Outcomes**

### **Mode of Delivery**

No eligible studies reported on the adjusted association between mode of delivery and WIC participation.

### **Pre-Pregnancy and Postpartum Weight Status**

No eligible studies assessed the association of WIC participation with weight status in women before or after pregnancy (e.g., pre-pregnancy BMI, postpartum weight retention, or postpartum weight loss).

### **Gestational Weight Gain**

One study reported on the outcome of gestational weight gain.<sup>24</sup> It assessed weight gain as “less than recommended,” according to the Institute of Medicine (IOM) 2009 recommendations for weight gain for each category of pre-pregnancy BMI.<sup>27</sup> The study adjusted for multiple demographic and clinical risk factors but did not adjust for duration of pregnancy. This single-state (South Carolina) cohort using birth certificate data (N=275,482 women) showed that WIC participation (vs. non-WIC participation) among Medicaid enrollees was associated with a decreased likelihood of “less than recommended” (or inadequate) weight gain (3.3% lower adjusted mean risk; standard error (SE) 0.45%).<sup>24</sup>

Overall, we concluded that WIC participation may be associated with a lower likelihood of inadequate gestational weight gain. We graded the SOE as low based on medium study limitations and relatively precise findings in a single study.<sup>24</sup> See Appendix D, Evidence Table D-33 for details.

## **Maternal Health Behaviors**

One national cross-sectional study<sup>25</sup> used Pregnancy Risk Assessment Monitoring System (PRAMS) data from 1992 to 2013 (N= approximately 230,000) and reported adjusted associations between WIC participation and maternal smoking during and after pregnancy and alcohol use during pregnancy. The authors found no statistically significant differences in smoking during pregnancy or postpartum by WIC participation among Medicaid enrollees. Additionally, they reported that WIC participation was associated with a 22% lower probability of any alcohol use during pregnancy and a 3.8% lower probability of drinking more than one alcoholic beverage during pregnancy. Overall, based on the single cross-sectional study providing adjusted prevalence, we concluded that WIC participation may be associated with no difference in smoking during or after pregnancy, and lower alcohol use in pregnancy. We graded

the SOE as low based on medium study limitations, and relatively precise findings in a single study.<sup>25</sup> See Appendix D, Evidence Tables D-34 and D-35 for details of the outcome data.

## **Maternal Healthcare Utilization**

No studies assessed postpartum obstetric care utilization or any emergency room or primary care utilization.

## **Maternal Health Outcomes in 2009 Food Package Change Studies**

Studies that compare outcomes for WIC participants before versus after the 2009 food package change provide indirect evidence regarding the Key Question about the association of outcomes with WIC participation. One large study compared maternal antepartum and intrapartum outcomes for WIC participants before and after the 2009 food package change and thus provided indirect evidence regarding the Key Question about the association of outcomes with WIC participation.<sup>26</sup> This study used linked birth certificate and hospital discharge data from 2007 to 2012 (2,897,537 infants born to 2,441,658 mothers) to conduct difference in differences analysis with maternal fixed effects to compare outcomes over time relative to the general population. The authors found that the revised food package was associated with small reductions in the incidence of maternal preeclampsia (-0.6% points; 95% confidence interval (CI), -0.8 to -0.4) for WIC participants compared with the general population. Because of the severity of preeclampsia, a small reduction in incidence may be clinically significant when translated to the population level.<sup>26</sup> In this same study, the revised food package was not associated with a difference in the incidence of gestational diabetes (-0.04% points; 95% CI, -0.3 to 0.2). The same study showed a reduction in the percentage of pregnancies with “greater than recommended” weight gain (-3.2%; 95% CI, -3.6 to -2.7). The study also reported an increase in the adjusted percentage of women with recommended gestational weight gain (2.3%; 95% CI, 1.8 to 2.8) and a small increase in those with “less than recommended” gestational weight gain (0.9%; 95% CI, 0.5 to 1.2).<sup>26</sup> Analyses were adjusted for sociodemographic variables on the birth certificate, education, age, race/ethnicity, parity, and infant’s sex and year of birth.

The evidence was graded as insufficient to determine whether WIC participation with the revised food package was associated with differences in preeclampsia, gestational diabetes, gestational hypertension, or gestational weight gain among WIC participants compared with WIC-eligible non-participants. The SOE was insufficient because there was only a single study with medium limitations, and the study did not directly compare WIC participants with eligible non-participants. See Appendix D, Evidence Tables D-30, D-31, and D-32 for details.

## **Neonatal and Birth Outcomes**

Three studies directly assessed the association of maternal WIC participation with neonatal and birth outcomes and had a comparison group of individuals who were income eligible (based on Medicaid insurance) for WIC but did not participate.<sup>28-30</sup> A fourth study was large and used a pre-post difference in differences analysis to compare outcomes before and after the 2009 food package change for WIC recipients (vs. general population non-WIC recipients, an indirect comparison).<sup>26</sup> Table 5 summarizes findings and SOE from the three studies that most directly addressed the question regarding WIC participation and neonatal and birth outcomes. The studies were too heterogeneous (in terms of study design, study population, and outcome measures) to support a meta-analysis. See Appendix D, Evidence Tables D-140, D-144 through D-153 for details.

**Table 5. Summary of evidence on whether neonatal and birth outcomes were associated with maternal WIC participation compared with eligible non-WIC participants**

| Outcome   | Number of Studies<br>Participants(N)   | Study Results  | Conclusions  | Strength of Evidence<br>(Rationale) <sup>a</sup>   |
|---|--|--|--|--|
| <b>Fetal death, stillbirth and neonatal mortality</b> | <ul style="list-style-type: none"> <li>1 state-level retrospective cohort (236,564 women)<sup>28</sup></li> </ul>  | <ul style="list-style-type: none"> <li>No statistically significant association between WIC participation and perinatal death, after adjusting for time-varying exposure to WIC.</li> </ul>                                  | WIC participation during pregnancy may not be associated with no difference in perinatal death overall           | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul>          |
| <b>Preterm birth</b>                                  | <b>3 studies</b> <ul style="list-style-type: none"> <li>1 state-level cross-sectional study (102,079 mothers)<sup>29</sup></li> <li>1 national cohort study (11,148,261 infants)<sup>30</sup></li> <li>1 state-level retrospective cohort (236,564 births)<sup>28</sup></li> </ul> | <ul style="list-style-type: none"> <li>WIC associated with 3% longer gestation in adjusted fixed effects model.</li> <li>Among 2 other cohort studies, WIC associated with 12% - 15% lower risk of preterm birth.</li> </ul> | Maternal WIC participation is likely to be associated with decreased risk of preterm birth and longer gestation. | Moderate <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul>  |
| <b>Infant low birth weight</b>                        | <b>2 studies</b> <ul style="list-style-type: none"> <li>1 state-level retrospective cohort (236,564 infants)<sup>28</sup></li> <li>1 state-level cross-sectional (102,079 mothers)<sup>29</sup></li> </ul>   | <ul style="list-style-type: none"> <li>WIC participation was associated with significantly decreased risk of low birth weight infants in two studies.</li> </ul>   | Maternal WIC participation is likely to be associated with decreased risk of low birth weight.                   | Moderate <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul>  |
| <b>NICU admission and hospital length of stay</b>     | <ul style="list-style-type: none"> <li>1 state-level cross-sectional study (102,079 mothers)<sup>29</sup></li> </ul>   | <ul style="list-style-type: none"> <li>WIC participation was associated with a decline (-1.6%) in the probability of NICU admission among women with Medicaid.</li> </ul>  | Inconclusive   | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Imprecise</li> </ul> |

NICU = neonatal intensive care unit; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Moderate strength of evidence indicates moderate confidence that the estimated association lies close to the true association; low strength of evidence indicates limited confidence that the estimated association lies close to the true association; and insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion.

## Fetal Death, Stillbirth, and Neonatal Mortality

One study reported on the association between WIC participation and fetal death/stillbirth or neonatal death (within 28 days after delivery).<sup>28</sup> A large retrospective cohort study used 2010 census data linked to California birth, hospital discharge, and WIC participation data (N=236,564) and evaluated the association of WIC redemption (vs. non-redemption) among women who were eligible based on Medicaid records. The study assessed the association of the timing of WIC enrollment and WIC food package utilization with perinatal death, defined as fetal or neonatal death 20 through 46 weeks after the last menstrual period. After adjustment for maternal sociodemographic and health characteristics and allowing for WIC exposure to vary over time, they reported a non-significantly lower hazard ratio (HR) for perinatal death for women who enrolled in WIC (0.89; 95% CI, 0.78 to 1.02) compared with women who were not enrolled in WIC during pregnancy.<sup>28</sup>

Overall, the SOE was low for no association between maternal WIC participation and the risk of perinatal death. We graded the SOE as low based on medium limitations of the single study. See Appendix D, Evidence Tables D-140 and D-141 for details of the outcome data.

## **Preterm Birth**

Three studies reported on WIC participation and preterm birth.<sup>28-30</sup> A national cohort study used birth certificate data (N=11,148,261 births) from Medicaid insured mothers who received (vs. did not receive) WIC benefits in pregnancy. That study showed a lower adjusted odds ratio (OR) for preterm birth (0.88; 95% CI, 0.86 to 0.87) associated with WIC participation after adjustment for sociodemographic characteristics, clinical risk factors, receipt of prenatal care, and maternal smoking.<sup>30</sup> In one large single-state retrospective cohort that linked census, birth certificate, hospital discharge, and WIC participation data (N=236,564 women), WIC was associated with a lower risk of preterm birth (HR 0.85; 95% CI not reported) after adjustment for maternal characteristics and allowing for WIC exposure to vary over time.<sup>28</sup> Another single-state cross-sectional study used vital statistics natality data (N=102,079 mothers; 2004-2012) and showed that WIC was associated with a 2.71 percent (p<0.01) higher probability of longer gestation in an adjusted fixed effects model.<sup>29</sup>

We concluded that WIC participation is likely to be associated with a lower risk of preterm birth. We graded the SOE as moderate based on medium study limitations, relative consistency across studies, and precision in the study findings. See Appendix D, Evidence Table D-143, D-146 for details.

## **Infant Low Birth Weight**

Two studies reported on the association between WIC participation and infant low birth weight<sup>28, 29</sup> and one other study reported on mean infant birth weight.<sup>31</sup> One large single-state retrospective cohort study linked 2010 census, birth, hospital discharge data, and WIC participation data (N=236,564 women). Among women who were income-eligible based on Medicaid records, WIC redemption (vs. non-redemption) was associated with a significantly decreased risk of infant low birth weight (HR 0.81; 95% CI, 0.69-0.97).<sup>28</sup> One cross-sectional single-state study used vital statistics natality data (N=102,079 mothers; 2004-2012) to show that, among women with Medicaid, WIC participation (vs. non-WIC participation) was associated with a 2.5% (p<0.01) decrease in the probability of infants with low birth weight after multiple adjustments (i.e., 24% risk reduction).<sup>29</sup>

One other study, a cross-sectional analysis of infants from the Children's Health Watch Cohort from Boston, Massachusetts (N=336; 2007–2015),<sup>31</sup> assessed the association between maternal homelessness, WIC participation, air pollution, and mean infant birth weight.<sup>31</sup> They found that WIC participation (vs. non-WIC participation) was not significantly associated with mean infant birth weight at term (36 g; 95% CI, -7.3 g to 79.4 g), an outcome measure that excluded preterm and postterm infants. This study did not contribute to the SOE determination for the outcome of low birth weight because it reported a different outcome.

We concluded that WIC participation is likely to be associated with a lower risk of low birth weight. We graded the SOE as moderate based on medium study limitations, relative consistency across two studies, and precision in their findings. See Appendix D, Evidence Tables D-148 and D-150 for details.

## **NICU Admission or Hospital Length of Stay**

One study reported on the adjusted association between WIC participation and NICU admission.<sup>29</sup> The cross-sectional single-state study among women with Medicaid (N=102,079 mothers; 2004–2012), showed that WIC was associated with a 1.6% ( $p < 0.01$ ) adjusted decline in the probability of NICU admission.<sup>29</sup> The SOE was insufficient to support a conclusion about whether WIC participation was associated with NICU admission or hospital length of stay because of the paucity of studies and high study limitations owing to risk of confounding. See Appendix D, Evidence Table D-153 for details

## **Neonatal and Birth Outcomes in 2009 Food Package Change Studies**

Studies that compared outcomes for WIC participants before versus after the 2009 food package change provided indirect evidence regarding the Key Question about the association of outcomes with WIC participation. One large pre-post study using differences in differences analysis of linked birth certificate and hospital discharge data in California (N=2,897,537 infants; 2007–2012) showed that the revised food package was associated with a slightly longer mean gestational age at birth (mean of 0.018 weeks (~3 hours); 95% CI, 0.001 to 0.034) for WIC participants as compared with the general population of non-WIC participants. There was no significant association of the 2009 food package with preterm birth (0.17% change; 95% CI, -0.075 to 0.42).<sup>26</sup> We interpreted these findings cautiously because the analysis of preterm birth did not meet the parallel trends assumption (that in the absence of the intervention the difference between the intervention and control group outcome was constant over time) and the clinical significance of 3 hours longer gestation was not clear. This study also showed that the revised food package was associated with a very small reduction in the proportion of infants with low birth weight (-0.2%; 95% CI, -0.4 to -0.004), but not the proportion of infants with very low birth weight (-0.08%; 95% CI, -0.16 to 0.005) for WIC participants as compared with the general population of non-WIC participants. The revised food package was also associated with higher likelihood of being born at a birth weight appropriate for gestational age (0.94% points; 95% CI, 0.55 to 1.3) and lower likelihood of being born small (-0.42% points; 95% CI, -0.69 to -0.15) or large for gestational age (-0.52% points; 95% CI, -0.81 to -0.23).<sup>26</sup> This study also reported no differences in maternal hospital length of stay at delivery, defined as more than two days for vaginal delivery or four days for cesarean delivery (-0.001% change; 95% CI, -0.31 to 0.31) or hospital readmission within one year after birth (-0.056% change; 95% CI, -0.39 to 0.27).

The evidence was graded as insufficient to determine whether WIC participation with the 2009 food package change was associated with differences in preterm birth, infant birth weight, NICU admission, or maternal hospital length of stay among WIC participants compared with WIC-eligible non-participants. The SOE was insufficient because there was only a single study with medium limitations, and the study did not directly compare WIC participants with eligible non-WIC participants. See Appendix D, Evidence Tables D-142, D-144, D-146, D-147, D-149, and D-151 for details.

## **Breastfeeding Outcomes**

Breastfeeding outcomes are combined for Key Question 1 and Key Question 2 and reported under Key Question 2.

## Maternal Dietary Outcomes During Pregnancy and Postpartum

No studies were identified on the outcome of food security. One eligible study compared dietary outcomes for WIC participants with eligible non-WIC participants and is shown in Table 6.<sup>32</sup> A key measure used to assess overall dietary quality is the Healthy Eating Index (HEI).<sup>33, 34</sup> The HEI assesses how well the diet aligns with the key recommendations of the Dietary Guidelines for Americans (DGA). A total HEI score (out of 100 possible points) is the sum of component scores for intake of food groups and nutrients important for good health (e.g., whole grains, fruits, vegetables, and proteins) and reverse-scored for food groups and nutrients to be consumed in moderation (e.g., sodium, added sugars, and saturated fats).<sup>35</sup>

One study examined overall diet quality in a cohort of 1,454 women recruited during pregnancy in Tennessee between 2006 and 2011.<sup>32</sup> In adjusted analyses, WIC participants consuming the revised food package had a 2.38 points higher total HEI-2010 score (95% CI, 0.09 to 4.6) during pregnancy as compared with income-eligible non-WIC participants. Given a typical standard deviation (SD) for HEI for adults of 10-12 points,<sup>36</sup> this represents a difference of approximately 0.2 SD in diet quality. Across studies comparing the highest quartile versus the lowest quartile of diet quality (or similarly large contrasts), better diet quality is associated with reduced risk of preterm delivery, no difference in mean birth weight, and reduced risk of an infant large for gestational age.<sup>37</sup> Thus, the difference in diet quality by WIC participation in this study may be important at the population level even if the difference in risk is small at an individual level. This study also reported significantly greater consumption of fruit (HEI-total fruit score:  $\beta$ , 0.39 points; 95% CI, 0.11 to 0.67), greater consumption of whole grains that was not statistically significant ( $\beta$ , 0.51 points; 95% CI, -0.05 to 1.06), and lower fat intake that was not statistically significant ( $\beta$ , -1.2 g/1000 kcal; 95% CI, -2.48 to 0.07). At one-month postpartum, no significant differences in HEI-2010 scores were identified, but the differences in consumption of whole grains ( $\beta$ , 0.31; 95% CI, -0.27 to 0.88) and fat intake ( $\beta$ , -1.15; 95% CI, -2.68 to 0.38) were of similar magnitude to those reported during pregnancy. The first month postpartum is characterized by multiple transitions for women, and characterization of dietary intake at that time is challenging. For this reason, these comparisons of postpartum dietary intake should be viewed with caution.

Based on the medium limitations of the only eligible study on maternal dietary outcomes, we rated the SOE as low that WIC participation during pregnancy may be associated with better diet quality and greater intake of fruit. See Appendix D, Evidence Tables D-37, D-43, D-51, D-53, D-56, D-61, D-65, D-69, D-77, D-84, D-90, D-94, D-101, D-104, D-109 for details.

**Table 6. Summary of evidence on maternal dietary outcomes and WIC participation during pregnancy and postpartum time periods compared with eligible non-WIC participants**

| Outcome  | Number of Studies and Participants (N)   | Study Results   | Conclusions  | Strength of Evidence (Rationale) <sup>a</sup>   |
|--|--|---|--|---|
| <b>Overall diet quality using the HEI-2010</b> | <ul style="list-style-type: none"> <li>1 difference in differences analysis of data from cohort study of women in Tennessee (1279 pregnant, 1177 postpartum)<sup>32</sup></li> </ul> | <ul style="list-style-type: none"> <li>WIC associated with 2.4 points higher HEI score during pregnancy, no difference at one month postpartum.<sup>32</sup></li> </ul> | WIC participation during pregnancy may be associated with better diet quality. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul> |

| Outcome                   | Number of Studies and Participants (N)   | Study Results  | Conclusions   | Strength of Evidence (Rationale) <sup>a</sup>   |
|---------------------------|--|--|---|---|
| <b>Food group intakes</b> | <ul style="list-style-type: none"> <li>1 difference in differences analysis of data from cohort study of women in Tennessee (1279 pregnant, 1177 postpartum)<sup>32</sup></li> </ul> | <ul style="list-style-type: none"> <li>WIC participation associated with a higher total fruit HEI component score during pregnancy, no difference at one month postpartum.<sup>32</sup></li> </ul> | WIC participation during pregnancy may be associated with greater intakes of total fruit. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul> |
| <b>Nutrient intakes</b>   | 0 studies  | NA   | None  | Insufficient  |

HEI = Healthy Eating Index, N = number of participants, NA = not applicable, WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Low strength of evidence indicates limited confidence that the estimated association lies close to the true association.

## Maternal Dietary Outcomes in 2009 Food Package Change Studies

As mentioned previously, studies that compare outcomes for WIC participants before versus after the 2009 food package change provide indirect evidence regarding the Key Question about the association of outcomes with WIC participation. One study conducted a cross-sectional analysis of National Health and Nutrition Examination Survey (NHANES) data to compare diet quality outcomes in WIC recipients before and after the 2009 food package change, comparing data from 2011 to 2014 with that from 2003 to 2006.<sup>38</sup> All women in the sample (N=312 unweighted; N=1,662,831 weighted) reported being direct beneficiaries of WIC (pregnant, breastfeeding for up to 12 months, or postpartum up to 6 months). The 2009 food package change was associated with a non-significantly higher total HEI score ( $\beta$ , 3.1 points; 95% CI, -1.0 to 7.2). Small but not statistically significant increased scores were detected for whole grain consumption ( $\beta$ , 0.9; 95% CI, -0.01 to 1.9); seafood and plant protein consumption ( $\beta$ , 0.7; 95% CI, -0.1 to 1.5); and consumption of empty calories, which is reverse scored, indicating decreased consumption of empty calories ( $\beta$ , 1.9; 95% CI, -0.2 to 4.0). No findings regarding other specific nutrient intakes were reported.

The evidence was insufficient to determine whether the 2009 food package change was associated with differences in diet quality, food groups, and nutrient intake among WIC participants compared with WIC-eligible non-participants. The SOE was insufficient based on having only one study with high limitations and indirect relation to the Key Question about association with WIC participation despite the precise estimates. See Appendix D, Evidence Tables D-39, D-44, D-58, D-63, D-67, D-71, D-79, D-86, D-92, D-96, D-103, D-107, D-111 for details.

## Findings From Qualitative Studies About Maternal Outcomes

Three studies used qualitative methods to explore perceptions about diet quality and gestational weight gain during pregnancy. One study used focus group discussions<sup>39</sup> with overweight and obese pregnant and postpartum women (N=29) recruited from a community-based perinatal center in Madison, Wisconsin to explore multilevel barriers and facilitators to healthy eating and gestational weight gain. Women in the study reported that healthcare providers such as nurses, dietitians, social workers, and WIC staff were important sources of trusted nutrition information. However, many women mentioned that they received different

information from their obstetricians versus the WIC staff, and one stated that “sometimes they [WIC staff] have their views on things that are much different than your doctor’s views.”

Differences in the information received was also mentioned in another study conducted among WIC participants (N=59) in Los Angeles, California.<sup>40</sup> In this study, focus group discussions were used to examine perceptions and barriers to healthy eating and appropriate gestational weight gain to inform the development of an intervention. Women felt that they had limited knowledge surrounding an appropriate weight gain goal or behaviors and, while having regular weight monitoring check-ups, received little or inconsistent information from healthcare providers, including from WIC. However, a few women indicated that they learned about appropriate weight gain from WIC with one stating that “here in WIC, yes, every time they weigh me they say that 10–15 pounds is what is normal to gain during pregnancy for me. But in the [health] clinic, no.” Participants in this study were also concerned about gaining too much weight during pregnancy and reported that pressure from family members to “eat for two” was a barrier to appropriate diet and weight gain.

In two studies, respondents commented on WIC as a source of advice for healthy eating. One study conducted in-depth interviews with WIC-eligible, pregnant Latina women (N=45, 78% enrolled in WIC) within Hartford County, Connecticut to identify barriers and facilitators to improved prenatal fruit and vegetable intake.<sup>41</sup> Women shared that, although friends and family had the largest influence on their fruit and vegetable intake, primary healthcare providers and WIC staff were also good sources for nutrition education, with one woman stating that “they [WIC] give you little brochures and like menus of tips of things that you can eat...” Women in the above-referenced study in Madison, Wisconsin<sup>39</sup> also reported that WIC policies targeting healthy foods enabled them to eat healthier, but some felt frustrated and embarrassed when using WIC vouchers. See Appendix D, Evidence Table D-139 for details.

**Key Question 1a. Does the association of maternal and infant outcomes with WIC vary by gestational age at WIC enrollment or duration of the mother’s WIC participation?**

## **Key Point**

- The evidence was insufficient to determine whether maternal and infant outcomes varied by gestational age at WIC enrollment or duration of mother’s WIC participation owing to the paucity of studies examining this question (SOE: Insufficient).

## **Maternal Health Outcomes**

No studies addressed the association of maternal health outcomes by gestational age at WIC enrollment or duration of the mother’s WIC participation.

## **Neonatal and Birth Outcomes**

For neonatal and birth outcomes, the evidence was insufficient for assessing the association with gestational age at WIC enrollment or duration of mother’s WIC participation owing to only one study assessing the relationships, as described below.<sup>28</sup> One retrospective cohort study linked to California Medicaid and WIC participation data (N=236,564; 2010) showed no dose-response relationship between perinatal death (defined by the study as fetal or infant deaths 20 through 46



weeks after the last menstrual period) and trimester of WIC initiation.<sup>28</sup> See Appendix D, Evidence Table D-141 for details.

## Maternal Dietary Outcomes

No studies addressed the association of maternal dietary outcomes by gestational age at WIC enrollment or duration of the mother's WIC participation.

**Key Question 1b.** Does the association of maternal and infant health outcomes with WIC vary by participant factors such as age of the mother at delivery, race/ethnicity of mother, geographic location (e.g., region, urban vs. rural), education of the mother, employment status of the mother, marital status, or housing (e.g., public, homeless)?

## Key Points

- Maternal WIC participation may be associated with lower risk of inadequate gestational weight gain in Black and White women (SOE: Low).
- Maternal WIC participation may be associated with lower risk of late presentation for antenatal care for Black, White, Hispanic, and Asian women (SOE: Low).
- WIC participation may be associated with lower risk of stillbirth in Black women (SOE: Low).
- The association between WIC participation and risk of preterm birth may not vary by race and ethnicity (SOE: Low).
- Participation in WIC and Medicaid may help to reduce the association between a history of incarceration and the risk of low birth weight or preterm birth (SOE: Low).

## Maternal Outcomes

### Differences by Race and Ethnicity

Three studies examined whether the association between WIC participation and maternal outcomes differed by race or ethnicity. One single-state cohort study (N=275,482 women; 2004–2013) showed that WIC participation was associated with less frequent **inadequate weight gain** in the overall sample, and the association was significant in both Black women (-3.49% adjusted mean change; standard error (SE), 0.65%) and White women (-2.64% adjusted mean change; SE, 0.62%).<sup>24</sup> The first study indicates low SOE that WIC participation may be associated with less frequent inadequate gestational weight gain in both Black and White women. See Appendix D, Evidence Table D-33 for details.

One large pre-post study used a difference in differences analysis of data from 2007–2012 to evaluate the 2009 food package change for WIC participants compared with the general population which includes both eligible and ineligible non-participants. The study presented stratified analyses by race and ethnicity and evaluated several maternal health outcomes, including preeclampsia, gestational diabetes, and gestational weight gain.<sup>26</sup> For **gestational diabetes**, compared with White women, Black and Asian women experienced a slightly greater reduction in incidence (White women, 0.71% points; 95% CI, 0.27 to 1.1; Black women, -1.1% points; 95% CI, -2.0 to -0.24; Hispanic women, -0.31% points; 95% CI, -0.70 to 0.083; Asian

women, -1.1% points; 95% CI, -1.9 to -0.22). In the same study, there were no statistically significant differences by race and ethnicity for the outcome of **preeclampsia**.<sup>26</sup> The study also reported a reduction in the percentage of pregnancies with **excess gestational weight gain** (-3.2% points; 95% CI, -3.6 to -2.7) across the racial and ethnic groups examined, with the largest differences for Black women (-5.5% points; 95% CI, -7.7 to -3.3) and White women (-4.2% points; 95% CI, -5.2 to -.2). Hispanic women and Asian women also had a reduction in risk of excess gestational weight gain (Hispanic women, -1.8% points; 95% CI, -2.7 to -1.0; Asian women, -2.2% points; 95% CI, -3.7 to -0.80), but the reduction in those groups was statistically significantly lower than in White women. Compared with White women, Black women also experienced the greatest increase in achieving a **total weight gain within the recommended range** (White women, 2.2% points; 95% CI, 1.2 to 3.3; Black women, 3.8% points; 95% CI, 1.4 to 6.2), but the difference between Black and White women was not statistically significant.<sup>26</sup> The incidence of **inadequate gestational weight** gain increased in White, Black, Hispanic, and Asian women (White women, 2.0% points; 95% CI, 1.2 to 2.8; Black women, 1.7% points; 95% CI, -0.17 to 3.5; Hispanic women, 1.0% points; 95% CI, 0.35 to 1.7; Asian, 1.3% points; 95% CI, 0.095 to 2.7, and the estimates for Hispanic and Asian women were statistically significantly different from the estimate for White women. This study, focusing on the 2009 food package change, provides insufficient evidence to support a conclusion about how the association between WIC participation and maternal outcomes differs by race and ethnicity because it did not address the Key Question directly. See Appendix D, Evidence Tables D-30 through D-32 for details.

One study used data on singleton live births (from 20 to 44 weeks gestation) in California from 2007 to 2012, and reported findings stratified by race and ethnicity regarding WIC participation and risk of **late entry into antenatal care** (greater than 6 months of pregnancy).<sup>42</sup> In analyses restricting the sample to women with public insurance (and therefore likely WIC-eligible), and adjusting for age, education, parity, smoking, drug use, mental health and urban/rural, WIC participation was consistently associated with reduced risk of late entry into prenatal care for non-Hispanic White women (0.7; 95% CI, 0.7 to 0.7); Black women (0.6; 95% CI, 0.6 to 0.6); Hispanic women (0.7; 95% CI, 0.6 to 0.8) and Asian women (0.7; 95% CI, 0.6 to 0.7). This study offers low SOE that WIC participation was associated with lower risk of late entry into antenatal care in the racial and ethnic groups examined without differences between non-Hispanic White, Black, Hispanic, and Asian women. See Appendix D, Evidence Table D-36 for details.

## Neonatal and Birth Outcomes

### Differences by Race, Ethnicity, and Education

Two studies with direct evidence reported on the outcome of stillbirth.<sup>43, 44</sup> One nested case-control study used the Stillbirth Collaborative Research Network to identify stillbirth cases (defined as 18 weeks or later and meeting criteria for ‘no sign of life’) and live-born controls to assess the association between WIC participation (vs. non-WIC participation) and stillbirth or live birth by race and ethnicity.<sup>43</sup> In analyses restricting the sample to those with Medicaid (549 live births; 262 stillbirths), and adjusting for demographic characteristics, prenatal care, smoking, drug use, and maternal morbidities, WIC participation was protective against stillbirth for Black women (adjusted OR, 0.23; 95% CI, 0.09 to 0.59), but not White women (adjusted OR, 2.11; 95% CI, 0.75 to 5.95), and was associated with elevated risk for Hispanic women (adjusted OR,

2.16; 95% CI, 1.06 to 4.37).<sup>43</sup> In contrast to the finding for Black women, which was robust across analyses presented, other models suggested no difference in risk of stillbirth for Hispanic women related to WIC participation. In conclusion, we found low SOE for reduced risk of stillbirth for Black women based on one study with medium limitations that reported a strong clinically important association that was precise and robust across analyses. Although one analysis in that study indicated that WIC was associated with increased risk of stillbirth for Hispanic women, the risk estimate was relatively imprecise and was not robust across analytic models so the SOE was insufficient for that finding. See Appendix D, Evidence Table D-140 for details.

A single-state retrospective cohort study (N=39,608 births; 1991–2001) reported analyses adjusting for maternal age and education that showed WIC participation was associated with lower risk of stillbirth (greater than 20 weeks gestation) for women with less than 12 years of schooling (OR, 0.2; 95% CI, 0.1 to 0.3), those with 12 years of schooling (OR, 0.4; 95% CI, 0.3 to 0.7), and those with 13 to 15 years of schooling (OR, 0.3; 95% CI, 0.1 to 0.7). This study found no difference for those with 16 or more years of schooling (OR, 1.4; 95% CI, 0.4 to 4.3).

<sup>44</sup>Due to high limitations of the study, the evidence was insufficient to draw a conclusion about a difference in the outcome of stillbirth related to education. See Appendix D, Evidence Table D-140 for details.

Two studies with direct evidence<sup>29, 30</sup> and one study with indirect evidence<sup>26</sup> assessed the association of preterm birth with WIC by race or ethnicity. One large national cohort study using birth certificate data (N=11,148,261 infants) showed WIC participation (vs. non-WIC participation) was associated with decreased risk of preterm birth after adjustment for sociodemographic characteristics, clinical risk factors, receipt of prenatal care, and maternal smoking. The study showed similar results by racial or ethnicity subgroups (non-Hispanic White (adjusted OR, 0.90; 95% CI, 0.89 to 0.91), non-Hispanic Black (adjusted OR 0.88; 95% CI, 0.87 to 0.89), and Hispanic (adjusted OR, 0.91; 95% CI, 0.90 to 0.92)).<sup>30</sup> One cross-sectional study used vital statistics natality data (2004–2012) from South Carolina (46,350 White mothers and 55,729 Black mothers) to conduct a stratified analysis and showed that WIC participation was associated with decreased risk of preterm birth for both Black and White infants (-0.038 and -0.030, respectively), without statistical testing between groups.<sup>29</sup> For indirect evidence, one pre-post study used a difference in differences analysis of data from 2007 to 2012 to evaluate the 2009 food package change (N=2,897,537 infants) for WIC recipients compared with the general population which includes both eligible and non-eligible non-participants. The study showed no differences by racial or ethnicity subgroups in length of gestation or preterm birth.<sup>26</sup> In conclusion, we found low SOE that the association between WIC participation and preterm birth did not vary by race or ethnicity based on two studies with direct evidence, medium limitations, and relatively precise estimates, and one study with indirect evidence. See Appendix D, Evidence Tables D-143 and D-146 for details.

One study with direct evidence<sup>29</sup> and one with indirect evidence<sup>26</sup> assessed the association of WIC and low birth weight by race or ethnicity. In the direct comparison cross-sectional study from South Carolina, a stratified analysis showed that WIC participation (vs. non-WIC participation) was somewhat more protective for Black infants with a 63.0 g (p<0.01) increase in birth weight compared with White infants (38.6 g [p< 0.01]). In that study, WIC was also associated with a greater decrease in the adjusted probability of infants with low birth weight for Black versus White infants (-3.4% (p< 0.01) and -1.4% (p<0.01), respectively) without between group statistical testing.<sup>29</sup> For indirect evidence, one pre-post study used a difference in

differences analysis of data from 2007 to 2012 (N=2,897,537 infants) to evaluate the 2009 food package change and showed that WIC participation and the revised food package were differentially associated with birth weight in racial and ethnic groups.<sup>26</sup> Compared with the general population which included both eligible and non-eligible WIC non-participants, Black and White women who were WIC recipients had small reductions in their infants' mean birth weight, whereas Hispanic and Asian women who were WIC recipients had less reduction in their infants' birth weight compared with other racial and ethnic groups. Based on the direct and indirect evidence, we concluded that the SOE was insufficient to determine whether the association between WIC participation and low birth weight differed by race or ethnicity. See Appendix D, Evidence Tables D-148 and D-150 for details.

One cross-sectional direct evidence study used vital statistics natality data from 2004 to 2012 from South Carolina to assess associations between WIC participation among 5,948 White mothers and 6,713 Black mothers and NICU admission for their infants.<sup>29</sup> Among Black and White infants, WIC was associated with a 1.7% ( $p < 0.01$ ) and 1.5% ( $p < 0.01$ ) decrease in the probability of NICU admission, respectively, without between group statistical testing. We concluded that the SOE was insufficient to determine whether the association between WIC participation and NICU admission differed by race or ethnicity. See Appendix D, Evidence Table D-153 for details.

## **Differences by Other Participant Characteristics**

We also assessed differences in relevant outcomes by other participant characteristics when reported. One national cross-sectional study of PRAMS data (N=200,219 mothers; 2009–2017) assessed the moderating effect of WIC participation and Medicaid insurance together on the association between incarceration of a woman or her partner in the one year before childbirth (as a participant characteristic) and preterm birth.<sup>45</sup> After controlling for maternal race, age, college graduation, marital status, number of prior births, pregnancy planned, pre-pregnancy body mass index, income levels, state of residence, and year of birth, WIC and Medicaid together moderated the positive association between history of incarceration and preterm birth. The interaction term between incarceration and Medicaid indicated lower risk for preterm birth for incarcerated women who participate in WIC (OR, 0.82; 95% CI, 0.70 to 0.95). In addition, the same study showed that WIC and Medicaid together moderated the association between a maternal history of incarceration and an infant with low birth weight, indicating reduced risk for those in WIC and Medicaid (OR, 0.85; 95% CI, 0.75 to 0.96). We concluded from this single study with high limitations that the SOE was low that participation in WIC and Medicaid moderated the association between history of incarceration and neonatal and birth outcomes See Appendix D, Evidence Tables D-146 and D-151 for details.

## **Maternal Dietary Outcomes**

No studies addressed the association of maternal WIC participation with dietary outcomes by racial and ethnic subgroups or participant characteristics.

Key Question 2. Among infants and children eligible to participate in WIC, how is WIC participation associated with dietary and health outcomes in childhood?

## **Key Points**

### **Infant and Child Health Outcomes**

- Maternal WIC participation during pregnancy is likely to be associated with reductions in infant mortality (SOE: Moderate).
- Maternal WIC participation may be associated with increased child preventive care visits and immunizations during the first year of life (SOE: Low).
- Child WIC participation may be associated with increased immunizations of children (SOE: Low).
- The evidence was insufficient to determine whether either maternal or child WIC participation was associated with child health outcomes (including child mortality and morbidity) (SOE: Insufficient).

### **Child Anthropometric Status or Growth Outcomes**

- The evidence was insufficient to determine whether child WIC participation was associated with weight status in children (SOE: Insufficient).

### **Breastfeeding Outcomes**

- Maternal WIC participation is likely to be associated with no difference in breastfeeding initiation rate (SOE: Moderate).
- WIC participation may be associated with no difference in the introduction of solid foods before 4 months of age (SOE: Low).
- The evidence was insufficient to determine whether maternal or child WIC participation was associated with longer duration of any breastfeeding or with breastfeeding exclusivity (SOE: Insufficient).

### **Child Dietary Outcomes**

- Child WIC participation is likely to be associated with better child diet quality (SOE: Moderate).
- Child WIC participation is likely to be associated with greater intakes of 100% fruit juice, whole grain cereals, and age-appropriate shifts from whole milk to lower fat milk (SOE: Moderate).
- The evidence was insufficient to determine whether child WIC participation was associated with fruit or vegetable intakes (SOE: Insufficient).
- Child WIC participation may be associated with higher intakes of vitamin D and iron, and for children 2 to 4 years, with meeting the recommendations to limit saturated fat (SOE: Low).
- Household participation in WIC is likely to be associated with purchasing healthy food groups and reduced purchasing of less healthy foods and beverages (SOE: Moderate).

## Child Development and Academic Achievement

- Maternal WIC participation may be associated with higher child cognitive development scores (SOE: Low).
- Maternal WIC participation may be associated with no differences in measures of child communication and adaptive behavior in early childhood (SOE: Low).
- Maternal WIC participation may be associated with no differences in measures of child social development in early childhood (SOE: Low).
- The evidence was insufficient to determine whether child WIC participation was associated with cognitive development (SOE: Insufficient).
- The evidence was insufficient to determine whether either maternal or child WIC participation was associated with other child development outcomes (SOE: Insufficient).

## Infant and Child Health Outcomes

Seven studies assessed the association of WIC participation with infant and child outcomes.<sup>30, 46-51</sup> One study examined the association of duration of WIC participation with recovery from anemia and is discussed in the section on Key Question 2a/b. The studies were too heterogeneous (in terms of study design, study population, and outcome measures) to support a meta-analysis. Table 7 presents the summary of findings and SOE from studies that most directly addressed the question regarding WIC participation and infant and child health outcomes. See Appendix D, Evidence Tables D-154 through D-175 for details.

**Table 7. Summary of evidence on whether infant and child health outcomes were associated with maternal and/or child WIC participation compared with non-participants eligible for WIC**

| Outcome Domain   | Outcomes         | Number of Studies and Participants (N)  | Study Results   | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>  |
|------------------|------------------|---|---|--|--|
| <b>Mortality</b> | Child mortality  | 0 studies   | NA  | None   | Insufficient   |
|                  | Infant mortality | <b>2 studies</b> <ul style="list-style-type: none"> <li>• 1 national cohort(11,148,261)<sup>30</sup></li> <li>• 1 cross-sectional study (2,763)<sup>46</sup></li> </ul> | <ul style="list-style-type: none"> <li>• Both studies found maternal WIC participation was associated with lower odds of infant mortality (OR range 0.58 to 0.84).</li> </ul>   | Maternal WIC participation is likely to be associated with lower infant mortality. | Moderate <ul style="list-style-type: none"> <li>•Study limitations: Medium</li> <li>•Directness: Direct</li> <li>•Consistency: Consistent</li> <li>•Precision: Precise</li> </ul>              |
| <b>Morbidity</b> | Health status    | <ul style="list-style-type: none"> <li>• 1 cross-sectional study of children up to 36 months of age (26,950)<sup>47</sup></li> </ul>                                    | <ul style="list-style-type: none"> <li>• Child WIC participation attenuated odds of caregiver reported fair/poor child health status and enhanced odds of well-child status in children exposed to family stressors.</li> </ul> | Inconclusive   | Insufficient <ul style="list-style-type: none"> <li>•Study limitations: High</li> <li>•Directness: Indirect<sup>b</sup></li> <li>•Consistency: Unknown</li> <li>•Precision: Precise</li> </ul> |

| Outcome Domain                | Outcomes               | Number of Studies and Participants (N)  | Study Results  | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>  |
|-------------------------------|------------------------|---|--|--|--|
|                               | Hospitalization        | <ul style="list-style-type: none"> <li>1 cross-sectional study of children up to 36 months of age (26,950)<sup>47</sup></li> </ul>  | <ul style="list-style-type: none"> <li>Child WIC participation did not attenuate odds of hospitalization in children exposed to family stressors.</li> </ul>   | Inconclusive   | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Indirect<sup>b</sup></li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul> |
| <b>Anemia</b>                 | Anemia                 | 0 studies   | NA   | None   | Insufficient   |
| <b>Healthcare utilization</b> | Preventive care visits | <ul style="list-style-type: none"> <li>1 cohort study of children younger than 1 year (290,377)<sup>48</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Maternal WIC participation was associated with more well-child visits in the first year of life.</li> </ul>   | Maternal WIC participation may be associated with increased child preventive care (well child visits) in the first year of life. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul>                      |
|                               | Immunizations          | <ul style="list-style-type: none"> <li>1 cohort study of children younger than 1 year (290,377)<sup>48</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Maternal WIC participation was associated with more vaccinations received within the first year of life per child.</li> </ul>   | Maternal WIC participation may be associated with increased immunizations of children in the first year of life.                 | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul>                      |
|                               | Immunizations          | <b>2 studies</b> <ul style="list-style-type: none"> <li>1 cross-sectional national study of children ages 19–35 months (13,460)<sup>49</sup></li> <li>1 cross-sectional national study of children ages 24–35 months (13,183)<sup>50</sup></li> </ul> | <ul style="list-style-type: none"> <li>Child WIC participation was associated with reduced odds of having 2 or more missed opportunities to receive the Hepatitis A vaccine.</li> <li>Child WIC participation was associated with increased immunization of children, and higher coverage of measles, diphtheria, tetanus, and pertussis.</li> </ul> | Child WIC participation may be associated with increased immunizations of children.  | Low <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul>                     |

OR = odds ratio; NA =not applicable; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup> Moderate strength of evidence indicates moderate confidence that the estimated association lies close to the true association, low strength of evidence indicates limited confidence that the estimated association lies close to the true association, and insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion;

<sup>b</sup>The study examined whether WIC participation attenuated the relationship between stressors and developmental risk, not WIC impact on developmental risk.

## **Mortality**

Two studies examined infant mortality (defined as death of a child younger than one year of age) associated with WIC participation during pregnancy.<sup>30, 46</sup> The studies used national or territory vital statistics and covariate adjustment procedures to derive comparisons regarding WIC participation. One national cohort study used birth certificate data (N=11,148,261) and showed that WIC live births, compared with eligible but non-WIC live births, had lower adjusted odds of infant mortality (adjusted OR, 0.84; 95% CI, 0.83 to 0.86; adjusted for sociodemographic characteristics, clinical risk factors, receipt of prenatal care, and maternal smoking). A cross-sectional study examined the association of family and neighborhood poverty on infant health outcomes among 2,763 singleton infants born to mothers in Puerto Rico from 1994 to 1995 using Puerto Rican Maternal Infant and Health Survey data.<sup>46</sup> In an analysis adjusting for poverty level, prenatal care, and insurance, maternal self-reported WIC participation in pregnancy was associated with lower odds of infant mortality in the entire study population (adjusted OR, 0.58;  $p<0.05$ ) and in the subset of the study population living below the poverty line (adjusted OR, 0.27;  $p<0.001$ ). Because the association was not significant once infant low birth weight status was included in the regression models, the authors concluded that WIC participation reduced infant mortality by decreasing the incidence of low birth weight.

We concluded that maternal WIC participation is likely to be associated with lower infant mortality. The SOE was moderate because the two eligible studies had medium study limitations, while results from the cohort study were precise and consistent with the cross-sectional study. No eligible studies reported on the outcome of child mortality (defined as death of a child less than five years of age). See Appendix D, Evidence Tables D-154 and D-155 for details.

## **Morbidity**

One cross-sectional study indirectly evaluated child morbidity associated with WIC participation.<sup>47</sup> This study analyzed Children's Health Watch data for children up to 36 months of age (N= 29,650; 2000-2010) and evaluated whether WIC participation attenuated the impact of two stressors (household food insecurity and maternal depressive symptoms) on child health status and hospitalizations.<sup>47</sup> Child WIC participation was associated with attenuated odds of caregiver-reported fair/poor child health status and increased odds of well-child status among children with two versus fewer stressors. WIC participation was not found to attenuate the association between number of stressors and history of any caregiver-reported hospitalization (2 vs. 0 or 1 stressor): WIC participant adjusted OR, 1.29 (95% CI, 1.16 to 1.44); WIC non-participant adjusted OR, 1.40 (95% CI, 1.05 to 1.87). Because there is only one study and it indirectly evaluated the impact of WIC on this outcome, the SOE was insufficient to determine whether WIC participation was associated with morbidity as measured by hospitalizations. See Appendix D, Evidence Tables D-156 through D-159 for details.

## **Anemia**

No eligible studies reported on the outcome of child anemia.

## **Healthcare Utilization**

Three studies reported on the association of WIC participation with infant and child healthcare utilization, including receipt of preventive care and immunizations.<sup>48-50</sup> One large prospective cohort study examined the association between maternal prenatal WIC enrollment (which was considered a proxy for infant enrollment) and receipt of preventive care (number of



well-child visits, probability of any well-child visit, and probability of meeting the recommendation for six well-child visits) among children younger than one year of age using South Carolina Medicaid and vital statistics data (N= 290,377; 2004 to 2013).<sup>48</sup> Maternal prenatal WIC participation was associated with increased well-child visit utilization in the child's first year of life adjusted for maternal sociodemographic factors, smoking, maternal prenatal morbidity, birth weight and gestational age, and maternal fixed effects (difference in number of well-child visits, 0.20; 95% CI, 0.16 to 0.23). This effect size was deemed important from a population health perspective, as any increase in well-child visits has potential to improve child outcomes. We concluded that maternal WIC participation may be associated with increased preventive care visits for children in the first year of life. The SOE was low given the one available study had medium limitations.

In the aforementioned prospective cohort study,<sup>48</sup> maternal prenatal WIC participation was also associated with a small positive difference in the probability of receiving any vaccination in the first year of life (1.36%; SE, 0.365;  $p < 0.01$ ), and with a mean of 0.22 (SE, 0.0258;  $p < 0.01$ ) more vaccines obtained in one year of life, adjusting for maternal and child characteristics and maternal fixed effects. We concluded that maternal WIC participation may be associated with increased immunizations of children in the first year of life. The SOE was low given the one eligible study had medium study limitations.

Two cross-sectional studies assessed current or former child WIC participation and immunization receipt using National Immunization Survey (NIS) data. One study reported reduced odds of two or more missed opportunities for hepatitis A vaccination for WIC vs. non-WIC participants (OR, 0.59; 95% CI, 0.45 to 0.77; adjusted for child age and sex, maternal sociodemographic characteristics, household poverty level, geographic location, and immunization mandates).<sup>49</sup> The second study used NIS data to compare the prevalence of receipt of other vaccines including diphtheria, tetanus, pertussis, and measles vaccinations through 24 months of age between 2007 and 2011.<sup>50</sup> Children currently in WIC were significantly more likely to be immunized than children formerly in WIC and those who were eligible but never participated. Because the difference in prevalence between WIC participants and eligible non-participants was on the order of 11 to 18 percent across the vaccines evaluated, this association was deemed important from a population health perspective. Immunization rates have a meaningful impact on future child and societal health. We concluded that child WIC participation may be associated with increased immunizations of children. The SOE was low given high study limitations of the two available studies. See Appendix D, Evidence Tables D-160 and D-161 for details.

## **Findings From Qualitative Studies About Infant and Child Health Outcomes**

No eligible qualitative studies addressed the association of infant and child health outcomes.

## **Child Anthropometric Status or Growth**

Nineteen studies assessed the association of WIC participation with a child's anthropometric status or growth.<sup>22, 23, 47, 51-66</sup> Of these, three studies directly compared risk-adjusted outcomes for WIC participants with eligible non-participants;<sup>47, 51, 63</sup> thirteen examined anthropometric outcomes of WIC children associated with the 2009 food package change;<sup>52-61, 64-66</sup>; and three studies evaluated anthropometric outcomes related to duration of WIC participation (Key Question 2a).<sup>22, 23, 51</sup>

Studies that evaluated child weight status used weight-for-length z-score (WLZ) among children younger than 24 months of age, body mass index z-score (BMIz) or weight-for-height z-score (WHZ) for children 24 months and older, or weight-for-age z-scores (WAZ).<sup>22, 23, 47, 51, 52, 54, 55, 57-66</sup> Children 2–4 years of age were classified as overweight or obese based on the Centers for Disease Control and Prevention (CDC) cut-points (BMIz between 85th and 95th percentile, and BMIz greater than or equal to 95th percentile, respectively). For younger children, WLZ was used, with values greater than or equal to the 95th percentile of the CDC reference considered indicative of high weight status. Studies evaluating growth outcomes reported findings on linear growth using attained length- or height-for-age z-scores (referred to as LAZ or HAZ),<sup>47, 51, 63</sup> or head circumference z-score.<sup>63</sup> Five studies reported growth velocity outcomes.<sup>54-57, 61</sup> All of these studies compared anthropometric data with the CDC attained size reference charts.

Table 8 summarizes findings and SOE from the three studies that most directly addressed the question regarding WIC participation and anthropometric or growth outcomes. Table 9 summarizes information from the eleven studies of anthropometric and growth outcomes associated with the 2009 food package change, and which provide indirect evidence regarding the question about association of outcomes with WIC participation. The studies were too heterogeneous (in terms of study design, study population, and outcome measures) to support a meta-analysis. See Appendix D, Evidence Tables D-163 through D-175 for details.

**Table 8. Summary of evidence on whether child anthropometric status or growth outcomes were associated with WIC participation compared with non-participants eligible for WIC**

| Outcome   | Number of Studies and Participants (N)   | Study Results  | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>  |
|---|--|--|--------------|--|
| <b>Child weight status</b>                            | <ul style="list-style-type: none"> <li>1 cross-sectional study of children up to age 36 months (26,950)<sup>47</sup></li> </ul>  | <ul style="list-style-type: none"> <li>Child WIC participation was associated with a non-significant attenuation of odds of overweight status among children exposed to family stressors.</li> </ul> | Inconclusive | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul>   |
| <b>Growth velocity</b>                                | 0 studies  | NA   | None         | Insufficient   |
| <b>Attained weight, length, or head circumference</b> | <ul style="list-style-type: none"> <li>1 difference-in-difference study of 1,222 maternal-child dyads before or after the 2009 food package change<sup>62</sup></li> </ul> | <ul style="list-style-type: none"> <li>Maternal WIC participation was associated with greater LAZ at age 12 months.<sup>b</sup></li> </ul>   | Inconclusive | Insufficient <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul> |
|   | <ul style="list-style-type: none"> <li>1 cross-sectional study of children born preterm (71)<sup>63</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Child WIC participation was associated with greater mean WAZ at 24 months corrected age, but not for LAZ/HAZ or head circumference-for-age.</li> </ul>        | Inconclusive | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Imprecise</li> </ul> |

HAZ = height-for-age z-score; LAZ = length-for-age z-score; NA =not applicable; WAZ = weight for-age z-score; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup> Insufficient strength indicates that evidence is unavailable or does not permit a conclusion;

<sup>b</sup> Inconsistent with findings at later ages, leading to lower rating of evidence.

## Child Weight Status

Only one study provided results comparing child overweight or obesity of WIC participants with non-participants,<sup>47</sup> and it was addressing whether WIC participation would modify the risk of overweight in children with family stressors<sup>47</sup>). Therefore, we were unable to draw a conclusion from one study regarding child WIC participation and child weight status or outcomes such as overweight or obesity in children 2 to 4 years of age. See Appendix D, Evidence Tables D-171 through D-175 for details.

## Growth Velocity

No eligible studies were identified for this outcome.

## Height, Weight, and Weight-for-Height Continuous Outcomes

Two studies reported associations with anthropometric outcomes as continuous measures.<sup>62, 63</sup> One study used longitudinal data on children from 2006 to 2010 whose mothers were enrolled during their pregnancies in the Conditions Affecting Neurocognitive Development and Learning in Early Childhood (CANDLE) study in rural Tennessee.<sup>62</sup> The study focused on self-reported prenatal participation in WIC and considered a birth that occurred after October 2009 to indicate some degree of exposure to the revised prenatal WIC food package. In analyses comparing children of prenatal WIC participants with children of eligible non-participants (and adjusting for multiple confounding factors), the authors reported a non-significant difference in WHZ (0.18; 95% CI, -0.16 to 0.52) and WAZ at 24 months of age (0.20; 95% CI, -0.10 to 0.51). At 24 months, the mean WHZ was 0.4, and the mean WAZ was 2.0; thus, although not significant, the direction of the differences suggests that the children of prenatal WIC participants were somewhat heavier. For LAZ, the authors reported a significant difference at 12 months of age associated with WIC participation (0.33; 95% CI, 0.05 to 0.61) but no differences at 24 months of age or 6 years of age. The mean LAZ at 12 months was 0.05 (about the median), and a difference on the order of one-third of a z-score (standard deviation) is likely to be clinically relevant and is relevant at the population level. However, the inconsistency of results across measures and time limits the conclusions to be drawn.

A cross-sectional study of 71 preterm (less than 37 weeks) infants attending a high-risk infant clinic at an urban hospital in California between 2013 and 2015 examined associations of WIC with or without SNAP participation and WAZ, HAZ, and head circumference for age (HCA) at 24 months of age.<sup>63</sup> The authors reported differences in mean WAZ for those in WIC or WIC and SNAP compared with non-participants eligible for WIC (adjusted for race, ethnicity, education, language, birth weight, neonatal comorbidity, and post-discharge diagnosis): WIC versus none: 1.32 (95% CI, 0.42 to 2.21); and WIC and SNAP versus neither: 1.19 (95% CI, 0.16 to 2.23). Similar analyses resulted in a non-significant adjusted mean difference in HAZ of 1.02 (95% CI, -0.07 to 2.12) for those in WIC versus non-participants eligible for WIC, but a significant difference of 1.42 (95% CI, 0.19 to 2.65) for those in WIC and SNAP versus WIC-eligible non-participants in both programs. No significant differences were found for HCA z-score: for the WIC versus none group, 0.18 (95% CI, -0.97 to 1.33) and for the WIC and SNAP versus neither group, -0.11 (95% CI, -1.44 to 1.22). Regardless of statistical significance, the reported differences could be clinically important in a high-risk population. Given the uniqueness of the study population and the small sample size, the results should be treated with caution. Given the paucity of studies and differences in the populations studied for these outcomes, the SOE was insufficient to determine whether WIC participation was associated with

these continuous anthropometric outcome measures. See Appendix D, Evidence Tables D-164 through D-166 for details.

## Child Anthropometric Status or Growth Outcomes in 2009 Food Package Change Studies

Studies that compared outcomes among WIC participants before versus after the 2009 food package change provided indirect evidence regarding the question about the association of outcomes with WIC participation. The findings from 13 studies are presented in Table 9.

**Table 9. Summary of evidence on the association of the 2009 food package change with child anthropometric status or growth outcomes in WIC participants**

| Outcome                    | Number of Studies and Participants (N)   | Study Results  | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>   |
|----------------------------|--|--|---|---|
| <b>Child weight status</b> | <p><b>5 studies of trends including pre-post 2009 food package changes using the same national data source with overlapping participants</b></p> <ul style="list-style-type: none"> <li>• WIC children ages 2–4 years, 2000–2014 (22,553,518)<sup>53</sup></li> <li>• WIC children ages 2–4 years, 2010–2016 (12,403,629)<sup>52</sup></li> <li>• WIC children ages 2–4 years, 2000–2014 (16,868,936)<sup>60</sup></li> <li>• WIC children ages 3–23 months, 2000–2014 (16,927,120)<sup>66</sup></li> <li>• WIC children ages 3–23 months, 2000–2018 (11,366,755)<sup>65</sup></li> </ul> <p><b>7 longitudinal studies of WIC children:</b></p> <ul style="list-style-type: none"> <li>• 6 from Los Angeles County, California using the same data source: (182,618)<sup>56</sup>, (74,781)<sup>54</sup>, (116,991)<sup>55</sup>, (260,935)<sup>57</sup>, (106,150)<sup>61</sup>, (79,502)<sup>64</sup></li> <li>• 1 from New York State (260,935)<sup>58</sup></li> </ul> | <ul style="list-style-type: none"> <li>• Obesity prevalence increased from 2000–2009, but decreased from 2010–2014.<sup>53, 60</sup></li> <li>• Overweight prevalence declined from 2010–2016. Declines in obesity prevalence were smaller but statistically significant. Similar declines were seen at each age from 2–4 years.<sup>52</sup></li> <li>• Revised food package associated with lower risk of obesity from ages 1–4 years in 3 of 4 studies.</li> <li>• Revised food package associated with lower risk of obesity at age 4 years across strata of initial WLZ.</li> <li>• Revised food package (less than fully breastfeeding, some formula or all formula fed) associated with lower risk of obesity at age 4 years.</li> <li>• Revised food package (for fully breastfeeding) was not associated with risk of obesity at ages 3–4 years.</li> </ul> | The 2009 food package change may be associated with lower risk of overweight or obesity among WIC children ages 2–4 years, which is indirect evidence of a relationship between WIC participation and these outcomes. | <p>Low</p> <ul style="list-style-type: none"> <li>• Study limitations: Medium</li> <li>• Directness: Indirect</li> <li>• Consistency: Consistent</li> <li>• Precision: Precise</li> </ul> |

| Outcome                | Number of Studies and Participants (N)  | Study Results  | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>  |
|------------------------|---|--|--|--|
|                        | <b>1 cross-sectional</b> study of WIC children in Los Angeles County, California (148,634) <sup>59</sup>  |  |  |  |
| <b>Growth velocity</b> | <b>5 longitudinal studies of WIC children</b> from Los Angeles County, California using the same data source (182,618) <sup>56</sup> ; (74,781) <sup>54</sup> ; (116,991) <sup>55</sup> ; (260,935) <sup>57</sup> ; (106,150) <sup>61</sup> | <ul style="list-style-type: none"> <li>• Revised food package associated with slower WLZ velocity from ages 6–12 months in one study<sup>56</sup> and this dip was positively associated with duration of receipt of fully breastfeeding package.<sup>61</sup></li> <li>• For infants not receiving the fully breastfeeding package, revised food package was associated with slower WLZ or WHZ velocities, in one study<sup>55</sup> but not in another.<sup>54</sup></li> <li>• Revised food package associated with slower WLZ or WHZ velocities from ages 1–5 years across initial WLZ strata.<sup>61</sup></li> </ul> | The 2009 food package change may be associated with slower WLZ or WHZ growth velocity between ages 0 and 4 years, which is indirect evidence of a relationship between WIC participation and these outcomes. | Low <ul style="list-style-type: none"> <li>•Study limitations: Medium</li> <li>•Directness: Indirect</li> <li>•Consistency: Consistent</li> <li>•Precision: Precise</li> </ul> |

WHZ = weight-for-height z-score; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children; WLZ = weight-for-length z-score.

<sup>a</sup>Low strength of evidence indicates limited confidence that the estimated association lies close to the true association

Five studies analyzed national WIC participant characteristics data to compare age, sex, and race-adjusted trends in the prevalence of high weight status among WIC-participating children 0 to 4 years of age.<sup>52, 53, 60, 65, 66</sup> The results are reported through 2016. Although time periods differed somewhat across studies, the increasing trends in prevalence of child overweight or obesity for children 2 to 4 years of age from 2000 to 2009 changed after 2009 or 2010, with flattening or decreasing trends in prevalence. Two studies reported results overall and by state, demonstrating consistency in these findings across state or state agencies.<sup>52, 60</sup> One study<sup>52</sup> reported consistent changes in prevalence between 2010 and 2016 for children 2, 3, and 4 years of age. Overweight prevalence declined three percent and obesity prevalence declined two percent, and significant reductions in overweight and obesity were seen overall and among age, sex, and racial/ethnicity subgroups (see Key Question 2b). Among younger children 3 to 23 months of age, the prevalence of high WLZ rose from 2000 to 2004 and then stabilized; from 2010 to 2014, the prevalence declined, and has remained constant from 2014 to 2018.<sup>65, 66</sup> These trends were seen in more than half of the state WIC agencies.

Eight studies of WIC participating children before or after the 2009 food package change evaluated high weight status and some considered the duration and timing of exposure to the

revised food package (see also Key Question 2a). In Los Angeles County, California, using data on children matched across gender, race/ethnicity, maternal education and language, family income and initial weight status, exposure to the revised food package from 0 to 4 years of age was associated with reduced risk of obesity at 4 years of age by 10 percent (risk ratio [RR] for boys, 0.88; 95% CI, 0.86 to 0.91; RR for girls, 0.90; 95% CI, 0.87 to 0.93) compared with the same duration of exposure to the food package before 2009.<sup>56</sup> Using this matched sample, another report from Los Angeles County, California found that exposure to the revised versus the pre-2009 food package was significantly associated with reduced risk of obesity at 4 years of age across all strata of WLZ at enrollment (low, average, high) for boys (RR, 0.86 to 0.90) but only for average WLZ for girls (RR, 0.84).<sup>61</sup> Another report from Los Angeles County, California found that the reduced risk of obesity at 4 years of age did not vary by family income or neighborhood poverty status.<sup>64</sup> In a related study, the neighborhood food environment did modify the risk of obesity at 4 years of age when comparing the revised versus the pre-2009 food package for girls but not boys.<sup>59</sup> Finally, in a longitudinal study of WIC children in New York State, getting the revised food package during the first year of life (all children had the revised package from 1 to 3 years of age) did not significantly affect obesity risk at 3 years of age.<sup>58</sup>

Results from several of these studies indicated that differences in the risk of obesity at 4 years of age varied by the type of food package received. In general, there was a higher risk of obesity at 4 years of age among those receiving formula during infancy as compared with those who were fully breastfed.<sup>55, 58</sup> Using matched samples of WIC children in Los Angeles County, California (as above, but also matched on food package status), one study reported that, among those fully formula fed, each additional year of exposure to the revised food package reduced risk of obesity at 4 years of age by one to two percent.<sup>54</sup> At 4 years of age, the risks of overweight and obesity were significantly reduced (RR for overweight, 0.93; 95% CI, 0.89 to 0.98; RR for obesity, 0.94; 95% CI, 0.89 to 0.99).<sup>54</sup> In another report from that study, no differences in risk of obesity were found comparing the revised versus the pre-2009 fully breastfed package, but reduced risk was found when comparing the revised versus the pre-2009 food package among those less than fully breastfeeding or with some formula feeding.<sup>55</sup> Another study from the same population reported that longer duration of receipt of the fully breastfed package was associated with lower risk of obesity at 4 years of age (most protective RR, 0.73, 95% CI, 0.64 to 0.82, at 7 months receipt duration), adjusting for child age, sex, year of birth, birth order, maternal education, race/ethnicity, language, and family poverty level.<sup>57</sup>

Five reports evaluated child growth velocity (differences in WLZ or WHZ growth trajectories) before versus after the 2009 food package change to estimate the risk of overweight and/or obesity at 2 to 4 years of age. These reports also used data from a longitudinal study of participating WIC children in Los Angeles County, California.<sup>54-57, 61</sup> To compare the growth velocity of those receiving the full dose revised food package with those receiving the full dose pre-2009 food package,<sup>56</sup> piecewise linear spline mixed models were fit using 6-month or 12-month periods, and interactions were fit to test for differences in velocity by revised versus pre-2009 food package received. Growth velocities were similar regardless of food package during the first 6 months of life, but large differences were observed during the second half of infancy, with infants exposed to the revised food package exhibiting a slower WLZ or WHZ velocity compared with those exposed to the pre-2009 food package (-0.413 with SD 0.031 for boys, and -0.439 with SD 0.030 for girls).<sup>56</sup> A difference on the order of 0.4 of an SD in WLZ velocity is striking and clinically significant and may be related to changes made by the revisions in specific infant food packages (see below). After the first year, the growth velocities were not generally

different but did point to slower velocities in children receiving the revised food package versus the pre-2009 food package from 3 to 4 years of age. The same modeling techniques for growth velocities were used to compare the revised food package with the pre-2009 food package from 0 to 5 years of age in analyses stratified by the type of infant package received and the child's sex.<sup>55</sup> Among those receiving the fully breastfeeding package, the 2009 food package change was associated with no differences in WLZ or WHZ. However, for the mostly breastfed, mostly formula fed, and fully formula fed groups, receipt of the revised food package was associated with slower WLZ velocities from 6 to 12 months of age, and this was generally true for both boys and girls. The study concluded that differences in velocities in the second half of infancy set up the growth patterns which led to the observed lower risk of obesity at 4 years of age. Following up infants who received the fully formula feeding package,<sup>54</sup> the authors identified only small and mostly non-significant food package change related differences in WLZ or WHZ velocities, except when comparing 4 years of exposure to the revised versus the pre-2009 food package.

One study compared growth patterns of children by the duration of receipt of the fully breastfeeding package.<sup>57</sup> The authors reported that longer exposure to the fully breastfeeding package was associated with faster WLZ velocities from 0 to 6 months of age and slower velocities from 6 to 12 months of age, which led to lower mean WLZ at 1 to 2 years of age. No effect modification was seen by receipt of the revised food package on these growth trajectories. In analyses evaluating the modifying effect of initial WLZ status category (low, average, high) on the association of exposure to the revised or the pre-2009 food package,<sup>61</sup> the differences in growth velocities by food package did not vary by initial WLZ status.

In summary, evidence suggests that the 2009 food package change may be associated with significantly lower risk of high weight status in WIC-enrolled children who are 0 to 4 years of age. The SOE was low for the prevalence studies based on medium study limitations, indirect relation to the Key Question, consistency across studies, and precise findings. None of the trend studies addressed secular changes, which may be a significant risk of bias. The longitudinal studies evaluating the 2009 food package change and risk of obesity used matched samples of WIC children and/or additional covariate adjustment that provide more rigorous indirect evidence regarding the Key Question. A limitation is that the evidence consists of multiple reports from one site, so the SOE was low. The clinical significance of the declining annual prevalence of overweight of 2 to 3 percent among children 2 to 4 years of age or a lower risk of overweight or obesity (by 10% at 4 years of age) is not clear. However, the trends are important from a policy perspective because the 2009 food package changes were enacted in part to address the increasing prevalence of obesity among WIC participants. A caveat to the conclusion may be that the type of infant food package matters. Studies from two locations suggest that the 2009 food package change was associated with reduced risk at 4 years of age among those receiving infant formula (fully formula fed, some formula, less than fully breastfed), whereas the change did not affect risk among those receiving the fully breastfeeding package (who were at lower risk of obesity in general).

Evidence suggests that the 2009 food package change may be associated with reduced WLZ velocity in WIC children at various time points from 0 to 4 years of age. The studies had medium limitations, indirect relation to the Key Question, consistent findings, and precision in the results, but all the studies originated from the same WIC setting in Los Angeles County, California. Taken together, these limitations support a conclusion of low SOE regarding a clinically important slowing of WLZ velocity from 6 to 12 months of age, and slower velocities from 3 to

4 years of age. Receipt of the revised versus the pre-2009 food package was associated with differences in growth velocities by type of infant food package received, with the revised food package associated with slower velocities for children not receiving the fully breastfeeding package. Greater duration of receipt of the fully breastfeeding package was associated with much slower WLZ velocity in later infancy. See Appendix D, Evidence Tables D-168, D-169, D-170, and D-174 for details.

## **Findings From Qualitative Studies About Child Anthropometric Status or Growth Outcomes**

No qualitative studies addressed the association of WIC participation with a child's anthropometric status or growth outcomes.

## **Breastfeeding Outcomes for Key Question 1 and Key Question 2**

Breastfeeding outcomes were combined for Key Question 1 and Key Question 2 because these outcomes are relevant for both maternal and child health and because these outcomes could be related to WIC participation of the mother and/or the child. Table 10 summarizes findings and SOE from the seven studies that most directly addressed the question regarding WIC participation and breastfeeding outcomes. Table 11 summarizes information from the five studies of breastfeeding outcomes associated with the 2009 food package change, and which provide indirect evidence regarding the question about association of breastfeeding outcomes with WIC participation. The AAP recommends that solid foods not be introduced until about 6 months of age, and the first 6 months is the recommended period of exclusive breastfeeding.<sup>8</sup> Therefore, in this section, we have included one study of the association between the early introduction of complementary foods and WIC participation (Table 10). This section also reports on the results of two studies on the receipt of WIC breastfeeding services and breastfeeding outcomes among WIC participants. The studies of breastfeeding outcomes were too heterogeneous (in terms of study design, study population, and outcome measures) to support a meta-analysis. See Appendix D, Evidence Tables D-176 through D-186 for details.



**Table 10. Summary of evidence on whether breastfeeding outcomes were associated with WIC participation during pregnancy (KQ1) and in childhood (KQ2) compared with non-participants eligible for WIC**

| Outcome   | Number of Studies and Participants (N)  | Study Results  | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>   |
|---|---|--|---|---|
| <b>Breastfeeding initiation</b>                   | <b>6 studies</b><br>4 population cohorts (from 3 studies) <ul style="list-style-type: none"> <li>• 1 PRAMS, 19 states (127,477)<sup>67</sup></li> <li>• 2 NIS 2005–2014 (73,991)<sup>67</sup>; (92,335)<sup>68 b</sup></li> <li>• 1 NHANES, WIC eligible children 0–59 months 2000–2008 and 2009–2014 (4,308)<sup>69</sup></li> </ul> 3 postpartum cohorts, South Carolina <ul style="list-style-type: none"> <li>• 2 birth certificates, 2004–2013 (271,096)<sup>24</sup> (254,150)<sup>70,b</sup></li> <li>• 1 PRAMS, 2009–2010 (1,238)<sup>71</sup></li> </ul> | <ul style="list-style-type: none"> <li>• No difference in breastfeeding initiation rates between WIC and non-WIC groups.<sup>67–69</sup></li> <li>• Breastfeeding initiation rates have increased over time for WIC participants but the increase is not different from non-WIC rates.</li> <li>• WIC participation associated with 1.48% increased initiation,<sup>24</sup> but no difference in another study<sup>70</sup> and lower rate of initiation in third study from same population.<sup>71</sup></li> </ul> | WIC participation is likely to be associated with no difference in breastfeeding initiation rates.    | Moderate <ul style="list-style-type: none"> <li>• Study limitations: Medium</li> <li>• Directness: Direct</li> <li>• Consistency: Consistent</li> <li>• Precision: Precise</li> </ul>               |
| <b>Breastfeeding duration</b>                     | <b>2 studies</b> <ul style="list-style-type: none"> <li>• NHANES: WIC eligible children 0–59 months 2000–2008 and 2009–2014 (4,308)<sup>69</sup></li> <li>• PRAMS data, South Carolina, 2009–2010, (1,238)<sup>71</sup></li> </ul>  | <ul style="list-style-type: none"> <li>• Child WIC participation was associated with lower prevalence of breastfeeding at age 6 months.<sup>69</sup></li> <li>• Among those who initiated breastfeeding and evaluated through 30 weeks, no difference by maternal WIC participation in the hazard ratio for discontinuing breastfeeding after adjustment for socioeconomic and other factors.</li> </ul>   | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>• Study limitations: High</li> <li>• Directness: Direct</li> <li>• Consistency: Inconsistent</li> <li>• Precision: Imprecise</li> </ul>         |
| <b>Breastfeeding exclusivity</b>                  | <ul style="list-style-type: none"> <li>• 1 population cohort, NIS national: (127,477)<sup>67</sup></li> </ul>   | <ul style="list-style-type: none"> <li>• No difference in exclusive breastfeeding at age 3 months by WIC participation.</li> </ul>   | Inconclusive  | Insufficient <sup>c</sup> <ul style="list-style-type: none"> <li>• Study limitations: Medium</li> <li>• Directness: Direct</li> <li>• Consistency: Unknown</li> <li>• Precision: Precise</li> </ul> |
| <b>Introduction of solids before age 4 months</b> | <ul style="list-style-type: none"> <li>• 1 population cohort, NHANES: WIC eligible children 6–36 months 2009–2014 (936)<sup>72</sup></li> </ul>   | <ul style="list-style-type: none"> <li>• Prevalence of solids introduction before age 4 months is declining and no difference by WIC participation.</li> </ul>   | WIC participation may be associated with no difference in introduction of solids before age 4 months. | Low <ul style="list-style-type: none"> <li>• Study limitations: Medium</li> <li>• Directness: Direct</li> <li>• Consistency: Unknown</li> <li>• Precision: Precise</li> </ul>                       |

KQ = Key Question; NIS = National Immunization Survey; NHANES = National Health and Nutrition Examination Survey; PRAMS = Pregnancy Risk Assessment Monitoring System; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup> Moderate strength of evidence indicates moderate confidence that the estimated association lies close to the true association, low strength of evidence indicates limited confidence that the estimated association lies close to the true association, and insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion;

<sup>b</sup> Overlapping samples;

<sup>c</sup> Because respondents are asked to recall the duration of exclusive breastfeeding a year later as part of an immunization survey, we considered this evidence as insufficient

## Breastfeeding Initiation

Six studies compared breastfeeding initiation between WIC participants and income-eligible non-WIC participants using national or multi-state surveys and birth certificate data.<sup>24, 67-71</sup>

Breastfeeding initiation was most often assessed through maternal responses to queries about whether the infant was ever breastfed or ever received breast milk. One study assessed breastfeeding status at hospital discharge as a surrogate for initiation.<sup>24</sup> These studies also used data over time to examine potential impact of the 2009 food package change. In two of the studies (using 3 data sources),<sup>67, 69</sup> prior to the 2009 food package change, WIC participation was negatively associated with breastfeeding initiation, and in the latter period, the differences were no longer statistically significant. This was also demonstrated in a recent study, but when the authors applied an instrumental variable approach to address selection bias in WIC participation, the earlier negative difference in initiation disappeared.<sup>68</sup> They found no difference in initiation by WIC participation overall (see additional results in Section 2a and 2b).<sup>68</sup> Using PRAMS data from 19 states, one study reported that the initiation rate increased 2.8 percent more among WIC participants comparing 2010 with 2004–2007, but this difference was only -0.08 percent in the NIS survey.<sup>67</sup> Three studies from South Carolina provided conflicting results.<sup>24, 70, 71</sup> In line with the PRAMS data, one South Carolina study used birth certificate data and found a 1.48 percent higher rate of initiation among WIC participants (SE 0.4%,  $p < 0.05$ ). However, a second study used the same South Carolina data, applied a difference-in-difference analysis approach, and found no differences in breastfeeding initiation for WIC participants compared with eligible non-participants.<sup>70</sup> The third study from South Carolina over-sampled for low birth weight and preterm delivery and found WIC participation was negatively associated with initiation.<sup>71</sup>

The studies evaluating WIC participation and breastfeeding initiation generally found no difference in breastfeeding initiation rates by WIC participation. We graded the SOE as moderate with respect to WIC participation and breastfeeding initiation based on medium study limitations, consistency across the majority of studies, and relatively precise findings. See Appendix D, Evidence Tables D-176 through D-180 for details.

## Breastfeeding Duration

Two studies compared breastfeeding duration between WIC participants and income-eligible non-WIC participants.<sup>69, 71</sup> They used different measures of duration. One national study reported that WIC participation was associated with lower prevalence of any breastfeeding at 6 months of age.<sup>69</sup> The other study, from South Carolina, used survival analysis to examine the probability of discontinuing breastfeeding through 30 weeks of age. In adjusted analysis, WIC participants were more likely to discontinue breastfeeding, but this difference became non-significant with adjustment for socioeconomic and other characteristics.<sup>71</sup>

Overall, the SOE was insufficient regarding WIC participation and duration of breastfeeding based on high study limitations, inconsistency across studies, and imprecise findings. See Appendix D, Evidence Tables D-181 and D-183 for details of the outcome data.

## Breastfeeding Exclusivity

Only one study compared exclusive breastfeeding between WIC participants and income-eligible non-WIC participants. A national study using the NIS reported no difference in exclusivity by WIC participation.<sup>67</sup> Because there was only one study, which had medium limitations according to the EPHPP (Effective Public Health Practice Project) tool in addition to the problem of relying on participants to recall the duration of exclusive breastfeeding a year later as part of an immunization survey, the SOE was insufficient with respect to differences in breastfeeding exclusivity by WIC participation. See Appendix D, Evidence Table D-182 for details of the outcome data.

## Early Introduction of Solid Foods

One study used NHANES data from 2009 to 2014 to compare the early introduction of solid foods by WIC participants with that by income-eligible non-WIC participants.<sup>72</sup> In adjusted analyses, WIC participants were not more likely to introduce solids before 4 months of age than non-participants eligible for WIC. Although there was only one study, because it was a national study, and had medium limitations, the SOE was low that WIC participation may be associated with no difference in the introduction of solid foods before 4 months of age. See Appendix D, Evidence Table D-186 for details.

## Breastfeeding Outcomes in 2009 Food Package Change Studies

Studies that compared breastfeeding outcomes for WIC participants before versus after the 2009 food package change provided indirect evidence regarding the Key Question about the association of outcomes with WIC participation. The findings from five studies are presented in Table 11.

**Table 11. Summary of evidence on the association of the 2009 food package change with breastfeeding outcomes in WIC participants during pregnancy and in childhood**

| Outcome                         | Number of Studies and Participants (N)  | Study Results  | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>  |
|---------------------------------|---|--|--|--|
| <b>Breastfeeding initiation</b> | <b>4 studies</b> <ul style="list-style-type: none"> <li>National sample of 17 local WIC agencies (88,251)<sup>73</sup></li> <li>PedNSS: 16 states, WIC infants (744)<sup>67</sup></li> </ul> <b>New York State PedNSS</b> <ul style="list-style-type: none"> <li>1 prospective trend analysis from 2002–2015 (about 110,000 per year);<sup>74</sup></li> </ul> <b>From local agencies</b> <ul style="list-style-type: none"> <li>Los Angeles County, California, repeated cross-sectional surveys with WIC participants: 2005 vs. 2008 vs. 2011 (5,020)<sup>75</sup></li> </ul> | <ul style="list-style-type: none"> <li>No change in breastfeeding initiation comparing 1–2 months before 2009 food package change vs. 5–12 months after change.<sup>73</sup></li> <li>Gradual increase in breastfeeding initiation over time or no change over time, both suggesting no impact of 2009 food package change.</li> <li>In one Los Angeles County study, there were higher odds of initiating breastfeeding in 2011 vs. 2008.<sup>75</sup></li> </ul> | The 2009 food package change may not be associated with breastfeeding initiation, which is indirect evidence of a relationship between WIC participation and this outcome. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul> |

| Outcome   | Number of Studies and Participants (N)  | Study Results  | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>  |
|---|---|--|---|--|
| <b>Breastfeeding duration</b>                     | <b>3 studies</b> <ul style="list-style-type: none"> <li>National sample of 17 local WIC agencies (115,068)<sup>73</sup></li> <li><b>New York State PedNSS</b></li> <li>1 prospective trend analysis from 2002–2015 (about 110,000 per year);<sup>74</sup></li> <li><b>From local agencies</b></li> <li>Los Angeles County, California, repeated cross-sectional surveys with WIC participants: 2005 vs. 2008 vs. 2011 (5,020)<sup>75</sup></li> </ul> | <ul style="list-style-type: none"> <li>Small or no change in prevalence of any breastfeeding at age 3 months in 3 studies.</li> <li>One study found a significant 10% greater prevalence of infants receiving the fully breastfeeding package at age 3 months after the 2009 food package change.</li> <li>Three studies found no change in the prevalence of any breastfeeding at age 6 months associated with the 2009 food package change.</li> </ul>   | The 2009 food package change may not be associated with breastfeeding duration, which is indirect evidence of no relationship between WIC participation and this outcome. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul> |
| <b>Breastfeeding exclusivity</b>                  | <b>3 studies</b> <ul style="list-style-type: none"> <li>1 prospective trend analysis from 2002–2015 (about 110,000 per years);<sup>74</sup></li> <li><b>From local agency Los Angeles County, California,</b></li> <li>Repeated cross-sectional surveys with WIC participants: 2005 vs. 2008 vs. 2011 (5,020)<sup>75</sup></li> <li>Monthly samples of infants (5,000) from 12/2007–10/2010<sup>76</sup></li> </ul>                                   | <ul style="list-style-type: none"> <li>Revised food package associated with higher odds of exclusive breastfeeding at age 3 months and at age 6 months.</li> <li>Revised food package change associated with increased rate of issuing fully breastfeeding food package at enrollment, at age 2 months, and at age 6 months.</li> <li>Increase in crude prevalence of exclusive breastfeeding at ages 3+ months from 2006–2015 (8.9% to 14.3%) and at ages 6+ months from 2006–2010 (2.9% to 5.8%).</li> </ul> | The 2009 food package change may be associated with breastfeeding exclusivity, which is indirect evidence of a relationship between WIC participation and these outcomes. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul> |
| <b>Introduction of solids before age 4 months</b> | 0 studies   | NA   | None  | insufficient   |

NA = not available; PedNSS = Pediatric Nutrition Surveillance System; vs. =versus; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Low strength of evidence indicates limited confidence that the estimated association lies close to the true association, and insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion.

Four studies evaluated changes over time in breastfeeding initiation among WIC participants only.<sup>67, 73-75</sup> Trends from national and New York state WIC data showed either no change or graduated increases in breastfeeding initiation over time, similar to the changes described nationally and suggesting no change in the trend after the 2009 food package change.<sup>67, 74</sup> A national study examining the immediate impact of the 2009 food package change found no difference in initiation (65.5% vs. 65.1%;  $p=0.58$ ).<sup>73</sup> However, among predominantly Hispanic WIC participants in Los Angeles County, California, a 2-fold higher adjusted odds of breastfeeding initiation was reported after the 2009 food package change (OR, 2.16; 95% CI, 1.69 to 2.76).<sup>75</sup> We graded the SOE as low with respect to WIC participation and the 2009 food package change based on medium study limitations, consistency across studies, and relatively precise findings. See Appendix D, Evidence Table D-173 for details.

Three studies assessed the 2009 food package change and prevalence of any breastfeeding at 3 months of age among WIC participants.<sup>73-75</sup> A national study among 17 local WIC agencies reported that receipt of full or partial breastfeeding packages declined significantly immediately after the 2009 food package change, suggesting a decline in any breastfeeding at 3 months of age.<sup>73</sup> In Los Angeles County, California, no significant change in any breastfeeding at 3 months of age was seen in WIC participants.<sup>75</sup> The temporal trends study in New York State WIC found increased rates of any breastfeeding at 3 months of age, but a gradual increase from 2002 to 2015.<sup>74</sup> Thus, the results indicated no change in breastfeeding at 3 months of age associated with the 2009 food package change among WIC participants. See Appendix D, Evidence Tables D-182 for details. Three studies assessed the 2009 food package change and prevalence of any breastfeeding at 6 months of age.<sup>73-75</sup> Again, results mostly indicated no change in the prevalence of any breastfeeding at 6 months of age before and after the 2009 food package change. The temporal trends in New York State breastfeeding from 2002 to 2015 indicated that the crude proportion of infants breastfed at 6 months of age has not increased since 2005.<sup>74</sup> In general, the revised food package was not associated with a change in breastfeeding duration (any breastfeeding at 3 or 6 months of age). The SOE was low based on medium study limitations, consistency across studies, and relatively precise findings. See Appendix D, Evidence Table D-182 for details.

Among studies of WIC participants and the 2009 food package change, three reported on prevalence of breastfeeding exclusivity at 2 to 3 months of age<sup>74-76</sup> and two on exclusivity at 6 months of age.<sup>75, 76</sup> One study reported that the revised food package was associated with a 1.72 (95% CI, 1.43 to 2.07) times greater likelihood of exclusive breastfeeding at 3 months of age, and a 3.08 (95% CI, 2.27 to 4.18) times greater likelihood of exclusive breastfeeding at 6 months of age.<sup>75</sup> In another study from the same local agency, the rate of fully breastfeeding issuance (no infant formula issuance) increased significantly ( $p<0.001$ ) after the 2009 food package change at enrollment (23.8% to 44.2%), at 2 months of age (12.7% to 19.9%) and at 6 months of age (8.5% to 13.9%). Trend data from that study showed a rise in fully breastfed issuance in conjunction with the 2009 food package change.<sup>76</sup> Trends in breastfeeding exclusivity for 1 or more or 3 or more months were evaluated among infants in New York WIC and, although the prevalence increased significantly, changes were gradual over time, suggesting no difference related to the 2009 food package change.<sup>74</sup> The SOE was low that the revised food package was associated with increased breastfeeding exclusivity among WIC participants based on consistency across the studies and relatively precise findings but medium study limitations. No studies provided adjusted comparisons of the early introduction of complementary foods before and after the 2009

food package change among WIC participants. See Appendix D, Evidence Tables D-178 and D-182 for details of the outcome data.

## **Receipt of WIC Breastfeeding Support Services**

One study from Minnesota evaluated the association between breastfeeding initiation and specific WIC services to support breastfeeding and breastfeeding initiation.<sup>77</sup> The study found 1.66 times (95% CI, 1.19 to 2.32) higher odds of breastfeeding initiation for those who received a prenatal peer counselor contact.<sup>77</sup>

Two studies evaluated the association between breastfeeding duration and specific WIC services to support breastfeeding.<sup>77, 78</sup> A national study of breastfeeding support services reported 20 percent higher odds of any breastfeeding at 6 months of age per support service. A study from Minnesota reported that prenatal peer counselor contacts were associated with a lower risk of discontinuing breastfeeding from birth through 12 months of age.<sup>77</sup> Among WIC participants, the availability or receipt of support services was associated with longer duration of breastfeeding with evidence up to 12 months of age. The SOE on breastfeeding initiation and duration was low based on medium study limitations, indirect relationship to the Key Question, consistent findings across studies and time points, and relatively precise findings.

Finally, a national study evaluating the number of breastfeeding supports available to participants reported 20 to 40 percent higher odds of an infant fully breastfed at 2 and 6 months of age per service available.<sup>78</sup> Based on having only one study, which had high limitations, the SOE was insufficient to conclude whether the availability of breastfeeding support services increased exclusivity of breastfeeding among WIC participants. See Appendix D, Evidence Tables D-183 and D-184 for details.

## **Findings From Qualitative Studies About Breastfeeding**

We identified nine qualitative studies that reported on breastfeeding perceptions among WIC participants.<sup>79-87</sup> The studies employed either focus groups<sup>79, 81, 82, 86, 87</sup> or semi-structured interviews.<sup>80, 83-85</sup> One study focused on experiences of WIC participants who breastfed (n=17) compared with those who formula fed (n=14).<sup>79</sup> Six of these studies examined experiences among subpopulations who experience disparities in breastfeeding rates, including African American women,<sup>80, 85</sup> Hispanic women,<sup>83</sup> rural women,<sup>86</sup> and immigrant women.<sup>81</sup> One focus group study concentrated on perceptions of African American WIC participants from the point of view of WIC peer counselors (n=23).<sup>82</sup> Another focus group study sought to understand WIC strategies to promote breastfeeding in Puerto Rico from the perception of WIC nutritionist-dietitians (n=29).<sup>87</sup> One mixed-methods study<sup>84</sup> sought to understand the influence of changes in the 2009 food package (n=52).

The studies reported overall positive cultural attitudes about breastfeeding among Hispanic women<sup>83</sup> and Marshallese immigrants.<sup>81</sup> However, both groups reported a perception that the U.S. culture did not approve of breastfeeding, and participants expressed feeling ashamed of breastfeeding in the United States. Hispanic and Marshallese immigrants noted that WIC helped to provide education on breastfeeding and related nutrition recommendations. WIC also provided access to formula that participants may not have had in their country of origin and this was a major driver in the decision to formula feed instead of breastfeeding. In contrast, in another study, some mothers who elected to formula feed felt judged or left out because of a perceived emphasis on breastfeeding in the WIC program.<sup>86</sup> Others experienced conflicting information about breastfeeding from WIC staff and physicians<sup>86</sup> or just lack of information from

physicians.<sup>85</sup> For example WIC peer counselors and midwives were mentioned as providing more education and encouragement to breastfeed than obstetricians who remained silent when asked about breastfeeding.<sup>85</sup>

In a study exploring the 2009 food package change, some women viewed the revised food package for exclusive breastfeeding as positively influencing their choice to breastfeed, but a majority noted that it did not influence their decisions.<sup>84</sup> Some women noted that their decision to breastfeed was based on other reasons (such as the health of the baby) and some women also noted that they would breastfeed regardless of whether there were nutritional or economic incentives in the food package.

In two focus group studies, African American WIC participants expressed that social support was among the most important factors that influenced initiation and duration of breastfeeding.<sup>80, 85</sup> The few participants that accessed WIC-related breastfeeding support services (e.g., lactation counselor) had a positive experience, but many participants reported being unaware of WIC services related to breastfeeding support and some expressed a desire to have peer role models who have breastfed long term.<sup>85</sup> In another study focused on the experiences of African American WIC participants, WIC peer counselors reported that resistance to breastfeeding arose from historical factors (e.g., slavery and black women's role as wet nurses) and , community perceptions of breasts as sexual organs not as a source of nutrition, as well as norms of black womanhood (e.g., strong black women may not ask for help).<sup>82</sup> In a study of nutritionist-dietitians from Puerto Rico, barriers to breastfeeding initiation included media and marketing and hospital resources that seem to support and/or glamorize bottles, pacifiers, and other accessories not aligned with breastfeeding success.<sup>87</sup> In this context, the WIC program was a valuable (and often the sole) source of education and support for participants. See Appendix D, Evidence Table D-139 for details of the data.

## **Child Dietary Outcomes**

No studies were identified that addressed the food security outcome, but nineteen studies examined associations between WIC participation and child dietary intakes. Various indices were used to examine dietary outcomes in children, including overall diet quality using the HEI score and a variety of individual food group and nutrient intake indices. Eight studies examined whether dietary intakes differed by WIC participation versus non-participation by those eligible for WIC, and are presented in Table 12.<sup>88-95</sup> Eight studies examined changes in dietary intakes of WIC children only associated with the 2009 food package change,<sup>96-103</sup> and represent indirect evidence with respect to the Key Question. These studies are presented in Table 13. Finally, three studies examined whether dietary outcomes differed by duration of WIC participation and are described in Key Question 2a.<sup>22, 104, 105</sup> The studies were too heterogeneous (in terms of study design, study population, and outcome measures) to support a meta-analysis. See Appendix D, Evidence Tables D-187 through D-261 for details.

**Table 12. Summary of evidence on whether diet quality, food group intakes, and nutrient intake outcomes for children were associated with WIC participation compared with non-participation by those eligible for WIC**

| <b>Outcome</b>   | <b>Number of Studies and Participants (N)</b>   | <b>Study Results</b>   | <b>Conclusion</b>   | <b>Strength of Evidence (Rationale)<sup>a</sup></b>  |
|--|---|--|---|--|
| <b>Child diet quality measured by the HEI-2010</b>                       | <b>2 studies</b> <ul style="list-style-type: none"> <li>• 1 national cross-sectional study [NHANES] of children ages 2–4 years, 2003–2008 vs. 2011–2012 (1,197)<sup>88</sup></li> <li>• 1 national cross-sectional study [NHANES] of children ages 2–4 years, 1999–2012 (6,151)<sup>91</sup></li> </ul> | <ul style="list-style-type: none"> <li>• WIC participation associated with 3.7- to 4.5-point higher HEI-2010 scores.<sup>88, 91</sup></li> </ul> | Child WIC participation is likely to be associated with better diet quality at 2 to 4 years of age. | Moderate <ul style="list-style-type: none"> <li>• Study limitations: Medium</li> <li>• Directness: Direct</li> <li>• Consistency: Consistent</li> <li>• Precision: Precise</li> </ul>              |
| <b>Child diet quality measured by a Toddler Diet Quality Index (DQI)</b> | <ul style="list-style-type: none"> <li>• 1 national cross-sectional study [FITS] of children 12-23 months, 2016 (882).<sup>94</sup></li> </ul>  | <ul style="list-style-type: none"> <li>• WIC participation associated with 2.1-point lower DQI score in toddlers.</li> </ul>                     | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>• Study limitations: Medium<sup>b</sup></li> <li>• Directness: Direct</li> <li>• Consistency: Unknown</li> <li>• Precision: Precise</li> </ul> |



| Outcome                  | Number of Studies and Participants (N)  | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>   |
|--------------------------|---|---|---|---|
| <b>Food group intake</b> | <b>5 studies</b> <ul style="list-style-type: none"> <li>• 1 national cross-sectional study [FITS] of children ages 6–47 months in 2016 (1,702)<sup>89</sup></li> <li>• 1 national cross-sectional study [NHANES] of children ages 12–23 months, 2011–2014 (286)<sup>93</sup></li> <li>• 1 national cross-sectional study [NHANES] of children ages 2–4 years, 2009–2014 (1,086)<sup>92</sup></li> <li>• 1 national cross-sectional [NHANES] of children 2–4 years (1,047)<sup>95</sup></li> <li>• 1 national cross-sectional study [FITS] of children 12–23 months, 2016 (882).<sup>94</sup></li> </ul> | <ul style="list-style-type: none"> <li>• Four studies found WIC participants were significantly more likely to consume 100% juice.<sup>89, 92–94</sup></li> <li>• WIC participants at 6–11 months of age were 1.29 times more likely to consume infant cereal,<sup>89</sup> and WIC participants had greater consumption of whole grain cereals or grains at 12–47 months in 2 of 3 studies</li> <li>• WIC participants at 12–23 months were 1.43 times more likely to consume whole milk,<sup>89</sup> but no difference in another<sup>93</sup>, and those at 24–47 months were 2.92 times more likely to consume non-fat or 1% milk.<sup>89</sup></li> </ul> | Child WIC participation is likely to be associated with greater intakes of 100% fruit juice, whole grain cereals, and age-appropriate shifts from whole milk to lower fat milk. | Moderate <ul style="list-style-type: none"> <li>•Study limitations: Medium</li> <li>•Directness: Direct</li> <li>•Consistency: Consistent</li> <li>•Precision: Precise</li> </ul>       |
|                          |   | <b><u>Vegetable intake</u></b> <ul style="list-style-type: none"> <li>• WIC participation was associated with greater consumption of baby food vegetables at 6–11 months,<sup>89</sup> greater consumption<sup>93</sup>, no difference<sup>89</sup> or lower consumption of vegetables<sup>94</sup> from 12–23 months, and greater consumption<sup>95</sup> or no difference</li> </ul>   | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>•Study limitations: Medium</li> <li>•Directness: Direct</li> <li>•Consistency: Inconsistent</li> <li>•Precision: Precise</li> </ul> |

| Outcome | Number of Studies and Participants (N) | Study Results   | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>   |
|---------|--|---|--------------|---|
|         |  | <sup>89, 92</sup> from 2 to 4 years.<br><br><b><u>Fruit intake</u></b> <ul style="list-style-type: none"> <li>WIC participation was associated with lower consumption of non-baby fruit at 6-11 months of age<sup>89</sup>, lower “any” or whole fruit consumption at 12-23 months of age in 2 of 3 studies <sup>89, 93, 94</sup>, but no differences from 2 to 4 years in 3 studies <sup>89, 92, 95</sup></li> </ul> | Inconclusive | Insufficient <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Inconsistent</li> <li>Precision: Precise</li> </ul> |

| Outcome                 | Number of Studies and Participants (N)   | Study Results   | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>  |
|-------------------------|--|---|--|--|
| <b>Nutrient Intakes</b> | 2 cross-sectional national studies [FITS] of:<br><ul style="list-style-type: none"> <li>• children ages 6–47 months in 2016 (1,453)<sup>90</sup></li> <li>• children 12-23 months, 2016 (882).<sup>94</sup></li> </ul> | <ul style="list-style-type: none"> <li>• More WIC participants met vitamin D requirements at all ages, and iron requirements at ages 6–11 months.<sup>90</sup></li> <li>• WIC participants were less likely to meet calcium requirements at 12-23 months, but no difference was found at 6-11 months or at 2-4 years</li> <li>• More WIC participants (+6.2%) met the saturated fat recommendation at ages 2-4 years</li> <li>• No difference in the proportion of children 2-4 years exceeding the recommended limits for added sugar, but from 12-23 months, one study found greater intakes of added sugar, but another did not</li> </ul> | Child WIC participation may be associated with higher intakes of vitamin D and iron and for children 2 to 4 years with meeting the recommendations to limit saturated fat. | Low<br><ul style="list-style-type: none"> <li>• Study limitations: Medium</li> <li>• Directness: Direct</li> <li>• Consistency: Unknown</li> <li>• Precision: Precise</li> </ul> |

DQI = Toddler Diet Quality Index; FITS = Feeding Infants and Toddlers Study; HEI = Healthy Eating Index; NHANES = National Health and Nutrition Examination Survey; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Moderate strength of evidence indicates moderate confidence that the estimated association lies close to the true association, low strength of evidence indicates limited confidence that the estimated association lies close to the true association, and insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion.

<sup>b</sup>The study had medium limitations but used a uniquely constructed diet quality index.

## Child Diet Outcomes

Two studies used national data from NHANES,<sup>88,92</sup> and one from the Feeding Infants and Toddlers Study (FITS) to evaluate diet quality.<sup>94</sup> One study<sup>88</sup> compared HEI-2010 scores from 2003–2008 and scores from 2011–2012 between WIC participants and income-eligible non-participants 2 to 4 years of age. In 2011-2012, child WIC participation was associated with a 3.7 points higher mean HEI-2010 score (95% CI, 0.6 to 6.9) than the mean score of eligible non-WIC participants. This study also reported higher component scores as the ratio of relative change for WIC participants versus income-eligible non-participants, with higher scores for

greens and beans (3.4; 95% CI, 1.3 to 9.4), whole grains (1.6; 95% CI, 0.9 to 2.6), and fatty acids (1.3; 95% CI, 1.0 to 1.8). No significant associations were found for the other component scores. The other study used NHANES data from 1999 to 2012,<sup>91</sup> and analyzed trends in HEI-2010 scores over time among children 2 to 4 years of age by WIC participation. From 1999 to 2012, HEI-2010 scores increased in both groups (linear trend  $p < 0.001$ ). In 2011–2012, WIC participants had an approximately 4-point higher mean HEI-2010 score (55.8; 95% CI, 53.9 to 57.8) than income-eligible non-participants (51.3; 95% CI, 48.9 to 53.7). This study did not evaluate diet quality component scores. Thus, WIC participation is likely to be associated with better child diet quality. Given an SD for HEI in children of about 10,<sup>106</sup> this difference is on the order of 0.3 to 0.4 SD and is likely important at both the individual and population level. The use of nationally representative data, standardized methods, and consistency of findings in the two studies of children 2 to 4 years of age, covariate adjustment, and precision of the estimates supported a moderate SOE for this conclusion. See Appendix D, Evidence Table D-187 for details.

One study used data on children 12 to 23 months of age from the FITS conducted in 2016 and constructed their own Toddler Diet Quality Index, (DQI). They found that WIC participation was associated with 2.1-point lower Toddler DQI score in WIC versus eligible non-WIC participants.<sup>94</sup> Although this study uses national data and had medium limitations, the use of a uniquely constructed diet quality index for an age group makes us interpret this study with caution, and we consider the evidence from this study inconclusive regarding diet quality in children 12 to 23 months. See Appendix D, Evidence Table D-198 for details.

Five studies compared food group intakes of WIC participants with income-eligible non-participants.<sup>89, 92-95</sup> These studies used national data from FITS or NHANES. In one study using FITS data,<sup>89</sup> intakes of food groups were compared at three ages: 6 to 11, 12 to 23, and 24 to 47 months. Compared with income-eligible non-participants, WIC participants 6 to 11 months of age were more likely to consume infant cereal (OR, 1.29; 95% CI, 0.91 to 1.81) and baby food vegetables (OR, 2.84; 95% CI, 2.00 to 4.04), but less likely to consume non-baby-food fruit (OR, 0.40; 95% CI, 0.26 to 0.62). WIC participants at 12 to 23 months of age were more likely to consume whole milk (OR, 1.43; 95% CI, 1.00 to 2.03) but less likely to consume any fruit (OR, 0.55; 95% CI, 0.34 to 0.88);<sup>89</sup> and WIC participants at 24 to 47 months of age were more likely to consume low or non-fat milk (OR, 2.92; 95% CI, 1.76 to 4.85).<sup>89</sup> WIC participants 6 to 47 months of age were more likely than income-eligible non-participants to consume juice (OR, 2.74; 95% CI, 1.62 to 4.64). Another study using FITS data but measuring intakes of food groups using an author-constructed DQI<sup>94</sup>, found that WIC participation as compared to eligible non-WIC participation at age 12-23 months was associated with a 0.7- point lower total vegetable DQI component score ( $p < 0.05$ ), a 1.1- point lower whole fruit ( $p < 0.05$ ) DQI component score, a 0.4 lower DQI score for 100% juice ( $p < 0.05$ ), but no difference in whole grain component scores. In studies of NHANES data, one study<sup>93</sup> focused on children 12 to 23 months of age. This study reported greater percentages of children in WIC versus income-eligible non-WIC children consuming grains (85.5% vs. 76.5%,  $p < 0.05$ ), vegetables other than potatoes (58.1% vs. 42.3%,  $p < 0.05$ ), and 100% juice (70.6% vs. 51.6%,  $p < 0.05$ ). Conversely, fewer WIC children (91.7%) consumed dairy than income-eligible non-WIC children (97.2%;  $p < 0.05$ ), but no differences were seen between groups in type of milk (i.e., whole vs. reduced fat) consumed. In a second NHANES study<sup>92</sup> of children 2 to 4 years of age, WIC participants consumed more total fruit (including 100% fruit juice) ( $\beta$ , 0.30 cup-equivalents per day; 95% CI, 0.04 to 0.57) and more 100 percent fruit juice ( $\beta$ , 0.22 cup-equivalents per day; 95% CI, 0.04 to 0.40) but not more

whole fruit or total vegetables than income-eligible non-WIC children. Conversely, a third NHANES study<sup>95</sup> found that WIC participation at 2-4 years of age was associated with greater mean intake of red/orange vegetables (0.18 vs 0.01 c equivalents) and legumes (0.07 vs 0.01 c equivalents).

Overall, the results indicated that WIC participation was associated with greater intake of some healthy food group options compared with income-eligible non-WIC children. These included greater intake of 100% fruit juice, whole grain cereals, and age-appropriate patterns of milk intake (i.e., whole fat milk from 12 to 23 months of age and low-fat or non-fat milk from 24 months of age onward). The SOE for this conclusion was moderate because of the use of national data, standardization of methods in the studies, consistency of expected differences by child age, the degree of covariate adjustment, and consistency between studies. These studies reported on intakes of specific food groups prioritized in nutrition education and through the WIC food package benefits. With respect to intakes of vegetables and fruits, the results were mixed, with no consistent pattern across age groups, and there is insufficient evidence to draw conclusions regarding these food groups.

Two studies used national FITS data from 2016 to compare nutrient intakes of WIC participants with income-eligible non-WIC participants.<sup>90, 94</sup> In one study, intakes were evaluated with respect to the Dietary Reference Intakes by age strata (ages 6 to 11 months, 12 to 23 months, and 24 to 47 months). More WIC participants had adequate vitamin D intakes at all ages ( $p < 0.05$ ). At 6 to 11 months of age, more WIC participants had vitamin D intakes above the Adequate Intake level (23.7% vs. 8.2%), and after 12 months, more WIC participants met the Estimated Average Requirement (EAR) for vitamin D (at 12 to 23 months of age: 23.9% vs. 17.4%; at 24 to 47 months of age: 20.7% vs. 11.3%). More WIC participants at 6 to 11 months of age met the EAR for iron intake (87.4% vs. 74.4%,  $p < 0.05$ ). Fewer WIC participants met the EAR for calcium intake at 12 to 23 months of age (89.3% vs. 94.1%,  $p < 0.05$ ), but no differences were found at the other two age groups. WIC participants at 24 to 47 months of age were more likely to meet the recommended intake of saturated fat (67.2% vs. 61.0 %,  $p < 0.05$ ), but there was no difference in the proportion of children 24 to 47 months that met the recommended limit for added sugars. Two studies assessed added sugar intake (as a percent of energy) in children 12 to 23 months of age. Given the lack of recommended limits for sugar intake in this age group, each study created limits for the comparison; one study reported that WIC participants were more likely to have sugar intakes exceeding 25% of energy (7.9 % vs. 2.4%,  $p < 0.001$ ).<sup>90</sup> However, the other study found no difference in mean added sugar component score (2.4 (0.2) vs. 2.2 (0.3) for WIC participants and non-WIC participants, respectively).<sup>94</sup>

Overall, we concluded that WIC participation may be associated with higher intakes of vitamin D and iron. WIC participants may be more likely to meet recommendations to limit saturated fat from 2 to 4 years of age. The SOE for these conclusions were low based on use of national data, standardization of methods in the studies, unknown consistency of expected differences by child age, the degree of covariate adjustment, and consistency between studies. See Appendix D, Evidence Tables D-189 through D-263 for details.

## **Child Diet Outcomes in 2009 Food Package Change Studies**

One study used the HEI to examine whether diet quality was associated with the 2009 food package change<sup>96</sup>, seven studies examined whether food group intakes were associated with the 2009 food package change<sup>97-103</sup>, and four examined whether nutrient intakes were associated with the 2009 food package change.<sup>97, 98, 103, 107</sup> Studies that compare outcomes among WIC

participants before versus after the 2009 food package change provide indirect evidence regarding the Key Question about the association of outcomes with WIC participation. The findings from these studies are presented in Table 13.

**Table 13. Summary of evidence on the association of the 2009 food package change with diet quality outcomes for children**

| Outcome                                      | Number of Studies and Participants (N)   | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>  |
|--|--|---|---|--|
| <b>Diet quality measured by the HEI-2005</b> | <ul style="list-style-type: none"> <li>1 cohort study of African American and Hispanic children ages 2–3.5 years in Chicago, Illinois pre- vs. 18 months post-2009 food package change (154)<sup>96</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Revised food package associated with a 4-point higher HEI-2005 among Hispanic, but not African American, children, with significant shift from whole milk to low fat milk in both groups.<sup>96</sup></li> </ul>  | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Unknown</li> <li>Precision: Imprecise</li> </ul> |
| <b>Food group intake</b>                     | <b>7 studies;</b><br><b>5 cross-sectional</b> <ul style="list-style-type: none"> <li>1 national study [NHANES] of children ages 24–59 months in WIC households 2005–2008 vs. 2011–2014 (1,078)<sup>97</sup></li> <li>1 national cross-sectional study [FITS] of children ages 6–47 months, 2008 vs. 2016 (1,595)<sup>100</sup></li> <li>1 study of preschool children in WIC households in rural New Mexico, 2008 vs. 2010 (163)<sup>103</sup></li> <li>1 study [NATFAN] of Native American WIC participants ages 2–4 years, 2009 vs 2010–2011 (1,642)<sup>101</sup></li> <li>1 study of predominantly Hispanic children younger than 5 years of age from Los Angeles County, California, 2009 vs. 2010 (6,000)<sup>99</sup></li> </ul> <b>2 cohort studies</b> <ul style="list-style-type: none"> <li>1 study of children ages 2–5 years in Atlanta, Georgia, pre vs. 1 week and 4 weeks after</li> </ul> | <ul style="list-style-type: none"> <li>In 2 studies revised food package associated with greater intakes of whole grains in children ages 2–24 months.<sup>97, 100</sup></li> <li>In 7 studies revised food package associated with greater intake of 1% or non-fat milk and/or decreased intake of whole milk.<sup>98–103</sup></li> </ul> | <b>Intake of whole grains and milk</b><br>The 2009 food package change is likely to be associated with greater intake of whole grains, and age-appropriate shifts from whole milk to lower fat milk, which is indirect evidence of a relationship between WIC participation and these outcomes. | Moderate <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul>    |
|  |  | <ul style="list-style-type: none"> <li>Revised food package associated with higher fruit and vegetable intakes in 2 studies<sup>100, 101</sup></li> </ul>   | <b>Intakes of fruits and vegetables</b><br>The 2009 food package change may be associated with increased intakes of fruits and vegetables (often in the form of baby food), which is indirect evidence of a relationship between WIC participation and these outcomes.                          | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Inconsistent</li> <li>Precision: Precise</li> </ul>       |

| Outcome                 | Number of Studies and Participants (N)  | Study Results   | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>   |
|-------------------------|---|---|--|---|
|                         | receiving revised food package (77) <sup>102</sup><br><ul style="list-style-type: none"> <li>1 study of children ages 2–3.5 years in Chicago, Illinois, pre vs. 6 months after receiving revised food package (273)<sup>98</sup></li> </ul>   |   |  |   |
| <b>Nutrient intakes</b> | <b>4 studies</b><br><ul style="list-style-type: none"> <li>1 national cross-sectional study [NHANES] of children ages 24–59 months in WIC households, 2005–2008 vs. 2011–2014 (1,078)<sup>97</sup></li> <li>1 cross-sectional study of preschool children in WIC households in rural New Mexico, 2008 vs. 2010 (163)<sup>103</sup></li> <li>1 cross-sectional study of children ages 4–24 months in Central Texas, 2009 vs. 2011 (204)<sup>107</sup></li> <li>1 cohort study of children ages 2–3.5 years in Chicago, Illinois, pre vs. 6 months after receiving revised food package (273)<sup>98</sup></li> </ul> | <ul style="list-style-type: none"> <li>Revised food package associated with greater intakes of fiber in 2 studies.<sup>97</sup></li> <li>Revised food package associated with a 10% reduction in gram/day intake of saturated fat<sup>103</sup> and with a lower intake of saturated fat (-1.18% of energy) in Hispanic children.<sup>98</sup></li> </ul> | The 2009 food package change may be associated with higher intakes of fiber and lower intakes of saturated fat, which is indirect evidence of a relationship between WIC participation and these outcomes. | Low<br><ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Inconsistent</li> <li>Precision: Precise</li> </ul> |

FITS = Feeding Infants and Toddlers Study; HEI = Healthy Eating Index; NATFAN = National Food and Nutrition Survey for WIC; NHANES = National Health and Nutrition Examination Survey; vs. = versus; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Moderate strength of evidence indicates moderate confidence that the estimated association lies close to the true association; low strength of evidence indicates limited confidence that the estimated association lies close to the true association; and insufficient strength indicates that evidence is unavailable or does not permit a conclusion.

One study reported changes in **diet quality** for WIC children by race/ethnicity, before and 18 months after the 2009 food package change.<sup>96</sup> Post-revision diet quality scores (HEI-2005) were significantly higher for Hispanic children (59.6 vs. 55.6,  $p=0.02$ ) but not for African American children (53.6 vs. 51.8,  $p=0.32$ ). These changes in HEI score are of similar magnitude to the differences in HEI score comparing WIC participants with eligible non-participants. However, because there is only one study, the evidence was insufficient for determining whether the 2009 food package change is associated with child diet quality. See Appendix D, Evidence Table D-188 for details.

Seven studies compared **food group intakes** before and after the 2009 food package change, with two national studies, one multi-state study, one large local WIC agency study, and three small local WIC agency studies. Multiple studies reported findings related to whole grains, fruits

and vegetables, and milk intakes. In one national study, significantly more WIC infants 6 to 11 months of age consumed any vegetables (55% vs. 29%) and baby-food fruits (56% vs. 41%) after the 2009 food package change.<sup>100</sup> Similarly, a study<sup>101</sup> of food group intakes of Native American WIC participants 2 to 4 years of age reported a higher percentage of children consuming fruits and vegetables after the 2009 food package change. However, in rural New Mexico,<sup>103</sup> an 8 percent reduction (95% CI, -15% to 0%) in vegetable intake was reported with no significant differences in fruit, fruit juice, vegetables including potatoes, and whole-grains. With respect to milk intakes, one study<sup>99</sup> of data from the Los Angeles County, California WIC program found that the numbers of children younger than 5 years of age who consumed whole milk decreased by 63 percent after the WIC 2009 food package change ( $p<0.001$ ) with corresponding increases in lower-fat milk ( $p<0.001$ ). Similarly, a study in Atlanta WIC clinics<sup>102</sup> found that the percentage of children consuming low-fat milk increased from 41.3 percent before receiving the revised food package to 58.8 percent and 79.5 percent at weeks one and four, respectively, after receiving the revised food package ( $p<0.001$ ). After adjustment, mothers reported increased child consumption of low-fat milk versus whole milk (OR, 7.36; 95% CI, 1.44 to 37.5). In rural New Mexico, a study<sup>103</sup> documented similar trends in preschool-age children from WIC participating households. A higher proportion of children consumed low-fat milk than whole milk (0.81 [post] vs. 0.60 [pre]) after the 2009 food package change compared with before the change. The likelihood of consuming low-fat milk was nearly 3 times higher after the 2009 food package change (OR, 2.94; 95% CI, 1.37 to 6.25).

Overall, the findings from the seven studies indicated that the revised food package is likely to be associated with greater consumption of healthier food options among WIC children. The moderate SOE grade for this conclusion is based on medium study limitations and overall consistency and precision of the findings despite the indirect relation to the Key Question. Multiple studies reported greater consumption of whole grains and age-appropriate shifts from whole milk to lower fat milk after the 2009 food package change. Positive patterns were also seen (although not as consistently) to suggest that the revised food package may be associated with greater intakes of fruits and vegetables, most frequently in the form of baby foods.

Some improvements toward meeting the Dietary Reference Intakes for **nutrient intake** were reported in three studies comparing intakes before and after the 2009 food package change. In WIC participants 25 to 59 months of age, a national study<sup>97</sup> reported higher mean intake of fiber (11.6 g vs. 10.6 g;  $p=0.004$ ), vitamin E (5.3 mg vs. 4.3 mg;  $p<0.001$ ) and phosphorous (1100 mg vs. 1040 mg;  $p=0.012$ ) after the 2009 food package change. In contrast, mean intake of zinc was marginally lower after the 2009 food package change (8.1 mg vs. 8.6 mg;  $p=0.061$ ). In rural New Mexico,<sup>103</sup> a 10 percent reduction in grams of saturated fat (95% CI, -3% to -16%) after the 2009 food package change was found. In a cross-sectional study of primarily Hispanic WIC infants and toddlers conducted in Central Texas<sup>107</sup> the mean intakes of iron, zinc, and vitamins A, D, and E for infants 6 to 11 month of age did not change. However, after the 2009 food package change, lower mean intakes were observed among toddlers 12 to 23 months of age for vitamin A (529 Retinol Activity Equivalents vs. 680 Retinol Activity Equivalents,  $p=0.05$ ) and zinc (4.8 mg vs. 4.9 mg,  $p=0.002$ ), whereas higher mean intakes were observed for potassium ( $p=0.017$ ), vitamin D ( $p=0.054$ ), and sodium ( $p=0.039$ ). After applying a Bonferroni correction, only the change in zinc intake was significant ( $p<0.006$ ). In a cohort study in Chicago, Illinois, 6 months after receiving the revised food package, Hispanic children had small increases in intake of fiber (+ 1 g/1000kcal,  $p=0.05$ ) and lower intake of saturated fat -1.8% of energy,  $p=0.01$ ).<sup>98</sup> No changes in nutrient intake were found for African American children.



Overall, we concluded that the 2009 food package change may be associated with better nutrient intakes. The SOE was low based on medium study limitations, reasonable precision of findings, and some inconsistency between studies, with an indirect relationship to the Key Question. Several of the findings were consistent with changes in food group intakes seen in other studies. For example, reduction in saturated fat (reported in 3 of 4 studies) was consistent with transitions to low-fat or no-fat milk, and increased fiber intakes (reported in 2 studies) were consistent with greater vegetable and whole grain consumption. See Appendix D, Evidence Tables D-193 through D-260 for details.

## Dietary Outcomes of Women in WIC Households

Five studies assessed dietary quality and/or intakes of food groups or nutrients among women in households participating in WIC (i.e., primarily caretakers of children participating in WIC). One study examined whether dietary intakes differed by WIC versus eligible non-WIC participation.<sup>108</sup> This study most directly addressed the question regarding WIC participation and dietary outcomes and is presented in Table 14. Four studies examined the impact of the 2009 food package change on dietary intakes among women in WIC households only and represent indirect evidence with respect to the Key Question.<sup>96-99</sup> Because these studies examined the dietary intakes of women in WIC households rather than WIC participants, they provide evidence of indirect impacts (or spillover effects) of child WIC participation on dietary intakes among women of reproductive age.

**Table 14. Summary of evidence on whether dietary outcomes of women in WIC households were associated with WIC participation compared with non-participants eligible for WIC**

| Outcome  | Number of Studies and Participants (N)   | Study Results   | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>  |
|--|--|---|--------------|--|
| <b>Diet quality of caregivers of WIC children measured by HEI-2005</b> | <ul style="list-style-type: none"> <li>Secondary analysis of WebNEERS data from Maine (stored EFNEP data), EFNEP vs. WIC vs. WIC and SNAP households (507).<sup>108</sup></li> </ul>     | <ul style="list-style-type: none"> <li>WIC participation not associated with differences in HEI-2005 scores.<sup>108</sup></li> </ul>                 | Inconclusive | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Imprecise</li> </ul> |
| <b>Food group intakes (component scores)</b>                           | <ul style="list-style-type: none"> <li>Secondary analysis of WebNEERS data from Maine (stored EFNEP data), EFNEP vs. WIC vs. WIC and SNAP WIC households (507).<sup>108</sup></li> </ul> | <ul style="list-style-type: none"> <li>WIC participation not associated with differences in HEI food group component scores.<sup>108</sup></li> </ul> | Inconclusive | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Imprecise</li> </ul> |
| <b>Nutrient intakes (component scores)</b>                             | <ul style="list-style-type: none"> <li>Secondary analysis of WebNEERS data from Maine (stored EFNEP data), EFNEP vs. WIC vs. WIC and SNAP WIC households (507).<sup>108</sup></li> </ul> | <ul style="list-style-type: none"> <li>WIC participation not associated with differences in HEI nutrient component scores.<sup>108</sup></li> </ul>   | Inconclusive | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Imprecise</li> </ul> |

EFNEP = Food and Nutrition Education Program; HEI = Healthy Eating Index; SNAP = Supplemental Nutrition Assistance Program; WebNEERS = Web-Based Nutrition Education Evaluation and Reporting System; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion.

Only one study evaluated diet quality using the HEI to compare WIC households with eligible non-WIC households, all of whom had also participated in the Expanded Food and Nutrition Education Program (EFNEP) in Maine.<sup>108</sup> The study reported no difference in HEI-2005 scores for WIC households ( $\beta$ , -0.40;  $p=0.86$ ) versus eligible non-WIC households after

EFNEP participation. Further, they found no differences in HEI food group or nutrient component scores. The evidence was insufficient to determine whether living in a WIC household was associated with diet quality or food group and nutrient intakes in women given the imprecise nature of associations and limited number of studies. See Appendix D, Evidence Table D-38 for details.

## Dietary Outcomes of Women in 2009 Food Package Change Studies

One study used the HEI to examine whether diet quality was associated with the 2009 food package change<sup>96</sup>, and four studies examined whether food group or nutrient intakes were associated with the 2009 food package change.<sup>96-99</sup> Studies that compare outcomes among WIC participants before versus after the 2009 food package change provide indirect evidence regarding the Key Question about the association of outcomes with WIC participation. The findings from four studies are presented in Table 15.

**Table 15. Summary of evidence on the association of the 2009 food package change with dietary outcomes of women in WIC households**

| Outcome  | Number of Studies and Participants (N)   | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>  |
|--|--|---|---|--|
| <b>Diet quality of caregivers of WIC children measured by HEI-2005</b> | <ul style="list-style-type: none"> <li>1 cohort study of diet of caregivers of WIC children in Chicago, Illinois, pre vs. 6 and 18 months post 2009 food package change (273)<sup>96</sup></li> </ul>  | <ul style="list-style-type: none"> <li>Revised food package not associated with significant change in HEI score at 18 months.</li> </ul>  | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Unknown</li> <li>Precision: Imprecise</li> </ul> |
| <b>Food group intakes</b>  | <b>4 studies</b> <ul style="list-style-type: none"> <li>2 studies from the same data source, a cohort study of diet of caregivers of WIC children in Chicago, Illinois, pre vs. 6 and 18 months post 2009 food package change (273)<sup>96, 98</sup></li> <li>1 national cross-sectional study [NHANES] of women ages 19–50 years in households receiving WIC benefits, 2005–2008 vs. 2011–2014 (1,078)<sup>97</sup></li> <li>1 cross-sectional study in Los Angeles County, California of pregnant or postpartum and/or caregiver of child enrolled in WIC in 2009 vs. 2010 (6,000)<sup>99</sup></li> </ul> | <ul style="list-style-type: none"> <li>Revised food package associated with lower consumption of whole milk and higher consumption of low-fat milk.<sup>96, 98, 99</sup></li> <li>Revised food package associated with higher consumption of whole grains,<sup>99</sup> and fruits<sup>98, 99</sup> and vegetables.<sup>99</sup></li> </ul> | The 2009 food package change may be associated with a healthier diet (i.e., greater intake of low-fat milk, whole grains, and fruits and vegetables, and lower consumption of whole milk) in women living in WIC households, which is indirect evidence of a relationship between WIC participation and these outcomes. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Consistent</li> <li>Precision: Imprecise</li> </ul>       |
| <b>Nutrient intakes</b>  | <b>3 Studies</b> <ul style="list-style-type: none"> <li>2 studies from the same data sources, a cohort study of diet of caregivers of WIC</li> </ul>   | <ul style="list-style-type: none"> <li>Revised food package associated with lower intake of saturated fat<sup>98</sup></li> </ul>   | The 2009 food package change may be associated with greater intake of   | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Consistent</li> <li>Precision: Imprecise</li> </ul>       |

| Outcome | Number of Studies and Participants (N)  | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup> |
|---------|---|---|---|---|
|         | children in Chicago, Illinois, pre vs. 6 and 18 months post 2009 food package change (273). <sup>96, 98</sup> <ul style="list-style-type: none"> <li>1 national cross-sectional study [NHANES] of women ages 19–50 years in households receiving WIC benefits, 2005–2008 vs. 2011–2014 (1078)<sup>97</sup></li> </ul> | and higher intake of fiber. <sup>96, 97</sup> <ul style="list-style-type: none"> <li>Revised food package associated with higher mean sodium intakes.<sup>97</sup></li> </ul> | fiber and lower intake of saturated fat in women living in WIC households, which is indirect evidence of a relationship between WIC participation and these outcomes. |   |

HEI = Healthy Eating Index; NHANES = National Health and Nutrition Examination Survey; vs.=versus; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Low strength of evidence indicates limited confidence that the estimated association lies close to the true association; and insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion.

One longitudinal cohort study reported changes in diet quality of caregivers for WIC participants before and 18 months after their children received the revised food package.<sup>96</sup> The revised food package was associated with non-significant increases in total HEI score for Hispanic and African American women (1.4% points increase for Hispanic mothers,  $p=0.62$ ; 5.8% points increase for African American mothers,  $p=0.13$ ). These changes are in the same range as that reported for women WIC participants; however, the evidence from this single study was insufficient to determine whether the 2009 food package change is associated with diet quality of women living in WIC households. See Appendix D, Evidence Table D-40 for details.

That longitudinal cohort study<sup>96</sup> also reported changes in intakes of food groups for caregivers 6 months and 18 months after their children received the revised food package. At 6 months post-revision,<sup>98</sup> changes in milk consumption were reported for Hispanic women with increases in reduced fat milk (0.6 [pre] vs. 0.8 [post],  $p=0.02$ ) and reductions in mean servings of whole milk observed (0.3 [pre] vs. 0.1 [post],  $p=0.004$ ). For African American women, only reductions in mean servings of whole milk (0.2 [pre] vs. 0.1 [post],  $p=0.02$ ) were noted at 6 months post-revision. At 18 months post-revision<sup>96</sup> both Hispanic and African American women were significantly less likely to report consumption of whole milk (32% vs. 5% and 18% vs. 9%, respectively). At 6 months post-revision, increased mean servings per day of fruits (0.8 [pre] vs. 1.1 [post],  $p=0.04$ ) were reported for Hispanic women, and fewer Hispanic women reported consumption of fruit juice (55% vs. 38%).<sup>98</sup> The other studies reporting differences in food group intakes associated with the 2009 food package change included one national study and one study from Los Angeles County, California WIC. Using NHANES data, one study<sup>97</sup> compared intakes of women 19 to 50 years of age living in households participating in the WIC program. In models adjusted for energy, age, race/ethnicity, poverty income ratio, and household size, mean intakes of women after the 2009 food package change were marginally lower for added sugars ([pre] 21.1 teaspoon-equivalents/day; SE, 0.8; [post] 17.8; SE, 1.6;  $p=0.068$ ), and higher for whole grains ([pre] 0.62 ounce-equivalents/day; SE, 0.08; [post] 0.89; SE, 0.19;  $p=0.087$ ). Using data from a cross-sectional survey of pregnant or postpartum women (about 20% of sample) or caregivers of children enrolled in the California WIC program,<sup>99</sup> investigators examined maternal dietary food group intakes before and after the 2009 food package change. In adjusted models, the percentage of women who usually consumed whole-grain foods increased 17.3 percentage points after the 2009 food package change, which was a 51 percent increase ( $p<0.001$ ). The percentage of women who usually consumed whole milk decreased 15.7

percentage points, which was a 60 percent reduction ( $p < 0.001$ ), with corresponding increases in lower-fat milk consumption ( $p < 0.001$ ). Small but significant increases were observed in family consumption of fruits (increase of 0.1 serving/day,  $p = 0.006$ ) and vegetables (7.2% increase,  $p < 0.001$ ).

Three studies also reported on nutrient intakes and the 2009 food package change. The national study<sup>97</sup> reported higher fiber intakes ([pre] 14.6 g/day; SE, 0.6; [post] 16.4; SE, 0.7;  $p = 0.013$ ) after the 2009 food package change. However, it also reported higher sodium intakes ([pre] 3096 mg/day; SE, 58; [post] 3342; SE, 63;  $p = 0.002$ ). For Hispanic caregivers of WIC children in Chicago, Illinois, small reductions in mean intakes of total fat and saturated fat as percentage of energy were reported at 6 months post-revision ( $p < 0.05$ ), and in saturated fat as a percentage of energy at 18 months post-revision ( $p = 0.05$ ).<sup>96, 98</sup>

Studies of the 2009 food package change reporting dietary intakes of women in WIC households consistently reported shifts away from whole milk to low-fat or non-fat milk, and when these shifts were reported, lower intakes of saturated fat were also noted. Other changes in food consumption were reported for dietary components directly targeted by the 2009 food package change (e.g., whole grain, fruits, and vegetables) and, consistent with those findings, increased fiber intakes. The studies reporting on intakes of food groups and nutrients had medium limitations and relatively consistent but imprecise findings. Therefore, we consider the SOE to be low for the studies on food groups and nutrient intakes. See Appendix D, Evidence Tables D-42, D-44, D-46 through D-50, D-52, D-55, D-58 through D-60, D-63, D-64, D-67, D-68, D-71, D-72, D-74, D-75, D-79 through D-83, D-87 through D-89, D-93, D-97 through D-100, D-104, D-108, D-112 for details.

## Household Purchasing/Benefit Redemption Outcomes

Eleven studies reported associations regarding WIC participation and outcomes of household purchasing or benefit redemption.<sup>21, 109-118</sup> Outcomes across studies varied and included expenditures (in dollars), benefit redemption and non-use, food group and nutrient intakes, purchases of foods and beverages classified as healthy, neutral, or to be consumed in moderation, and a household-level HEI. Six studies compared outcomes between WIC households and eligible non-WIC households (Table 16),<sup>109-113, 118</sup> and five studies evaluated purchasing patterns of WIC households before and after the 2009 food package change (Table 17).<sup>21, 114-117</sup> The studies were too heterogeneous to support a meta-analysis. See Appendix D, Evidence Tables D-113 through D-138 for details of the outcome data.

**Table 16. Summary of evidence on whether household purchasing outcomes were associated with WIC participation compared with non-participants eligible for WIC**

| Outcome                                   | Number of Studies and Participants  | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>   |
|---|---|---|---|---|
| <b>Household food purchasing patterns</b> | <b>6 studies</b> <ul style="list-style-type: none"> <li>3 studies using national FoodAPS data: WIC vs. eligible non-WIC participating households, comparing weeks with WIC benefits vs. without (out of pocket) (737)<sup>111</sup>; a</li> </ul> | <ul style="list-style-type: none"> <li>WIC participation associated with 2–3 times higher HEI food purchasing scores in two studies<sup>112, 113</sup> and, in one study, a 9-point higher score for weeks when WIC benefits were issued.<sup>113</sup></li> <li>WIC household participation</li> </ul> | WIC participation is likely to be associated with household purchasing of healthy food groups (including increased purchases of | Moderate <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul> |

| Outcome | Number of Studies and Participants   | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup> |
|---------|--|---|---|---|
|         | <p>matched analysis of WIC vs. non-WIC households (928)<sup>113</sup>; household comparisons of WIC-only, WIC plus SNAP, SNAP only, and eligible non-WIC participant households (1,510)<sup>112</sup></p> <ul style="list-style-type: none"> <li>• 2 studies using nationally representative Nielsen Homescan Consumer Panel data, N (unweighted)=584–1,052 households, representing 2,391,230–3,872,730 households in 2008–2010<sup>109</sup>; 5,324 low-income households with children ages 0–4 years in 2008–2014<sup>110</sup></li> <li>• 1 study using point-of-sale grocery data in Massachusetts and Connecticut, 2009 vs. 2010 (4,440)<sup>118</sup></li> </ul> | <p>associated with increased monthly purchasing of healthy foods and decreased monthly purchases of beverages to be consumed in moderation<sup>118</sup></p> <ul style="list-style-type: none"> <li>• WIC household participation associated with higher scores for total dairy,<sup>113</sup> whole grains,<sup>109-111, 113</sup> seafood/plant protein; and better scores for refined grains<sup>111, 113</sup> and empty calories.<sup>113</sup></li> <li>• WIC household participation associated with greater scores for total fruit and whole fruit in one study<sup>113</sup> but not in another.<sup>112</sup></li> <li>• WIC household participation not associated with scores for vegetables or saturated fats.<sup>112</sup></li> <li>• WIC household participation associated with decreased purchases of refined grains and whole milk.<sup>110</sup></li> </ul> | <p>whole grains, dairy, fruits, and seafood/plant protein), and reduced purchasing of less healthy foods and beverages (such as refined grains and whole milk).</p> |   |

FoodAPS = Food Acquisition and Purchase Survey; HEI = Healthy Eating Index; SNAP = Supplemental Nutrition Assistance Program; vs. = versus; WIC= Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Moderate strength of evidence indicates moderate confidence that the estimated association lies close to the true association.

Three studies constructed overall measures to assess diet quality based on food purchasing.<sup>112, 113, 118</sup> One study used national Food Acquisition and Purchase Survey (FoodAPS) data from 928 households with at least one person categorically eligible for WIC, evidence of income eligibility, and at least one food-at-home event during the week.<sup>113</sup> They calculated a household-level total HEI score as a measure of healthy purchasing. In a matched sample analysis, WIC participation was associated with a 2.74 (SE, 1.35) higher household HEI total score (p=0.04). When disaggregated into weeks when WIC benefits were issued, a larger difference in HEI-2010 score was estimated (9.44; SE, 1.57; p<0.001), but no difference in score by WIC participation was found when comparing weeks when foods were paid for out of pocket (-0.843; SE, 1.421). One national study used grocery purchase data and compared a household-level HEI-2015 total score among WIC-only households and eligible non-WIC households with a reference group of WIC-ineligible (i.e., higher income) households.<sup>112</sup> All households had either a woman of reproductive age (14 to 49 years) or a child younger than 5 years old. WIC-only households did not have a statistically significantly difference in total HEI

score compared with higher income households (-0.28; 95% CI, -2.51 to 1.95), whereas eligible non-WIC households had a statistically lower HEI, suggesting that WIC-households had higher HEI scores than eligible non-WIC households. Another study of grocery sales data in Massachusetts and Connecticut classified food and beverage purchases as healthy, neutral, or to be consumed in moderation and compared purchases between WIC households and former-WIC households before and after the 2009 food package.<sup>118</sup> Mean monthly ounces of total healthy foods purchased were higher (3.9%; 95% CI, 2.1% to 5.7%) among WIC households after the 2009 food package change, but were lower (-3.9%; 95% CI, -0.08% to -7.0%) over the same period among former WIC households. Mean monthly ounces of beverages to be consumed in moderation including whole milk (-24.7%; 95% CI, -22.6% to -26.7%) were lower for WIC households after the food package change, whereas over the same time period, no change was found for former WIC households (-3.0%; 95% CI, -7.2%, 1.5%).

Several studies used purchase data to evaluate food group component scores or food group purchases associated with WIC participation. When considering component scores, WIC households had significantly ( $p < 0.05$ ) higher scores for whole grains (1.829; SE, 0.338), total dairy (1.001; SE, 0.415), total fruit (0.798; SE, 0.202), whole fruit (0.534; SE, 0.247), and seafood/plant protein (0.901; SE, 0.261).<sup>113</sup> WIC households also had better (lower consumption) scores for components to be consumed in moderation: refined grains and empty calories.<sup>113</sup> However, no differences were found for sodium or fatty acid component scores. In one study that considered weeks when foods were purchased using WIC benefits,<sup>111</sup> WIC households acquired more whole grains per capita than eligible non-WIC households (1.33 vs. 0.72;  $p < 0.05$ ), but not more ounce equivalents of whole grains in cold cereal per capita (0.90 vs. 0.80;  $p > 0.10$ ). During weeks when WIC households paid for all food purchases out of pocket, they were 18.7 percent (SE, 5.5%) less likely to purchase at least one whole grain bread, and 19.9 percent (SE, 8.7%) less likely to purchase whole grain cold cereal. These findings suggest that WIC whole grain purchases replaced some of the usual whole grain purchases made by WIC families.

Two studies compared food expenditures and food group and nutrient intakes by WIC participation before and after the 2009 food package change.<sup>109, 110</sup> In one study, the change in whole grain purchases was evaluated using a sample from 2008 to 2010.<sup>109</sup> Using inverse probability weighting regression adjustment and focusing on households with young children, they reported a greater mean difference in difference of \$1.10 (SE, 0.34) for whole grain purchases for WIC households compared with non-WIC households. When considering continuous WIC participation over three years (and not just households with young children), they reported a greater mean difference in difference of \$0.77 (SE, 0.27) in whole grain purchases compared with non-WIC participation. A second study used this same data source but from 2008 to 2014, and compared food and beverage groups that the WIC program sought to encourage via the 2009 food package change (e.g., whole vs. refined grains) among WIC participating versus eligible non-WIC participating households with at least one child younger than 5 years of age.<sup>110</sup> Larger but non-significant differences in purchase declines over time were observed comparing WIC households versus non-WIC households for per capita daily calories, sodium, sugar, or total fat. Greater mean difference in the declines in purchases of refined grains were observed for WIC households (-4.3 g/capita; 95% CI, -6.2 to -2.3). Greater mean difference in the increase in g/capita purchases of whole grains were observed for WIC households (1.4; 95% CI, 0.4 to 2.4). Greater mean differences in the decline in g/capita purchases of whole milk was reported for WIC households compared with non-WIC households in the short term (-11.1; 95% CI, -18.9 to -3.3) and the long term (-15.9; 95% CI, -25.7 to -6.1).

Overall, the studies used different sources of data and considered overall quality of food purchases, as well as purchasing of food groups and select nutrients. The results consistently point to better quality of food purchasing for WIC households, greater purchases of healthier food group options (whole grains, seafood/plant protein, total fruit), and fewer purchases of less healthy foods (refined grains and whole milk). Only one study evaluated nutrients (sodium, total fat) and found no differences between WIC households and eligible non-WIC households. Based on the number of studies with medium limitations, consistent findings, and precision in the estimates, we conclude the SOE was moderate that WIC participation is likely to be associated with healthier food purchasing at the household level. See Appendix D, Evidence Tables D-113 through D-134 for details.

### **Food Purchasing Outcomes in 2009 Food Package Change Studies Among WIC Participants**

Studies that compared purchasing outcomes among WIC participants before versus after the 2009 food package change provide indirect evidence regarding the Key Question about the association of outcomes with WIC participation. The findings from five studies are presented in Table 17.

**Table 17. Summary of evidence on the association of the 2009 food package change with household purchasing outcomes in WIC participants**

| Outcome                                   | Number of Studies and Participants (N)  | Study Results  | Conclusion   | Strength of Evidence (Rationale) <sup>a</sup>   |
|---|---|--|--|---|
| <b>Household food purchasing patterns</b> | <b>5 studies</b> <ul style="list-style-type: none"> <li>4 studies used grocery point-of-sale data and compared New England WIC households before (2008) and after (2010) the WIC 2009 food package change (2,137)<sup>115-117</sup>, Connecticut WIC households only (515)<sup>114</sup></li> <li>1 state-level study in Wisconsin compared WIC household benefit redemption and purchasing of WIC foods before vs. 6, 12 and 18 months after the 2009 food package change. (243,806)<sup>21</sup></li> </ul> | <ul style="list-style-type: none"> <li>Revised food package associated with decreased purchases of whole milk<sup>114</sup> and white bread<sup>117</sup>, and increased purchases of whole grain bread and brown rice.<sup>117</sup> For both cheeses<sup>114</sup> and juice,<sup>115</sup> households used non-WIC funds to offset the food package change. Purchases of vegetables and fruits increased overall with households using WIC benefits and fewer non-WIC funds after receiving revised food package.<sup>116</sup></li> <li>Revised food package associated with decline in benefit redemption from 74.8% before the 2009 food package change to 70.4% at 18 months after the 2009 food package change, and a rise in non-use (0% of benefit used) from 5.5% to 10.3%.<sup>21</sup></li> </ul> | The 2009 food package change was likely associated with greater purchasing of healthier foods (e.g., whole grains, fruits, and vegetables), and reduced purchasing of less healthy foods and beverages (e.g., refined grains and whole milk), which is indirect evidence of a relationship between WIC participation and these outcomes. | Moderate <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Indirect</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul> |

WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Moderate strength of evidence indicates moderate confidence that the estimated association lies close to the true association.

Five studies evaluated purchasing patterns before versus after the 2009 food package change in WIC households.<sup>21, 114-117</sup> Four studies used the grocery point-of-sales data scanned from purchases made using a loyalty card from grocery stores in New England (Connecticut and Massachusetts) to evaluate WIC household purchasing patterns before and after the 2009 food package change, with some considering use of WIC benefits as well as non-WIC funds.<sup>114-117</sup> Among 515 Connecticut households, one study evaluated changes in milk and cheese purchases from select groceries.<sup>114</sup> After the 2009 food package change, purchases (expressed as volumes) of total milk, whole milk, and WIC-eligible cheese fell [(-14.2% (p<0.001), -50% (p<0.001), -37.2% (p<0.001), respectively)]. For both milk and cheese, some increase in purchasing using non-WIC funds was also reported, but the amounts of saturated fat from purchased milk and cheese declined by a mean of 85 grams per month per WIC household. Among a larger sample of 2,137 WIC-participating households, one study evaluated pre-post changes in juice and other beverage purchases.<sup>115</sup> After the 2009 food package change, WIC



juice purchases were reduced by approximately 71 ounces per month, in line with the juice allowance, and only a 13.6 percent (95% CI, 8.4% to 19.0%) increase in juice purchases was seen using non-WIC funds. Another study reported changes in fruit and vegetable purchases.<sup>116</sup> In line with the added fruit and vegetable benefit in the revised food package, purchases of fresh and frozen vegetables increased in volume [(17.5% (12.7% to 22.5%); 27.8% (19.8% to 36.3%), respectively)]; the volume of fresh and total fruit purchases increased 28.5 percent (95% CI, 23.8% to 33.5%) and 25.9 percent (95% CI, 21.5% to 30.6%), respectively, with no changes in canned fruit. The final study of this type reported changes in rice and bread intakes with the added whole grains benefit in the revised food package.<sup>117</sup> After the 2009 food package change, the share of 100 percent whole grain bread in total bread increased by 312% (95% CI, 285% to 341%) with concurrent reductions in non-100 percent whole grain bread. The share of brown rice in total rice purchases rose by 838 percent (95% CI, 662% to 1060%), while purchases of white rice remained unchanged.

WIC benefit redemption patterns of Wisconsin participants were evaluated one month prior to and then 6, 12 and 18 months after implementation of the 2009 food package change.<sup>21</sup> The percentage of WIC participants who fully used their monthly benefits declined from 74.8 percent at baseline to 70.4 percent at 18 months after the 2009 food package change, with little change in partial use (19.7% and 19.3%, respectively) and a rise in percentage non-use (0% of benefit used) from 5.5 percent to 10.3 percent. There were differences in non-use by race/ethnicity (see Key Question 1b). In adjusted analyses (adjusting for race and ethnicity, food package type, number of benefits issued), a trend for increased non-use after the 2009 food package change was observed at 6 months (OR, 1.34; 95% CI, 1.30 to 1.39), at 12 months (OR, 1.24; 95% CI, 1.20 to 1.28), and at 18 months (OR, 1.71; 95% CI, 1.65 to 1.76). When examining non-use by WIC participant category, percentage non-use at 18 months after the 2009 food package change was highest, at 20.2 percent, among postpartum women, which represented an 11.4 percent absolute increase ( $p < 0.0001$ ). Eighteen months after the 2009 food package change, the percentage of non-use for fully breastfed infants (ages 6 to 11 months) had declined by 18.2 percent, to 19.5 percent. Among children 1 to 4 years of age, the percentage non-use nearly doubled from 5.8 percent to 11.4 percent ( $p < 0.0001$ ). Non-use also doubled for partially breastfeeding women and pregnant women. After the 2009 food package change, overall use of cash value vouchers for fruits and vegetables was high: 77.8 percent of participants at 6 months and 76.6 percent at 18 months. Nearly all racial and ethnic groups saw greater full (100%) voucher use and non-use (0% of voucher used), but with some differences by race/ethnicity. Increased full voucher use was seen across participant categories; and for children, pregnant women, and postpartum women there were slight increases in percentage non-use ( $p < 0.001$ ). Purchase data from selected stores in Wisconsin was used to assess the extent to which participants made full benefit redemptions of specific foods, such as beans, peanut butter, milk, whole grains, fruits, and vegetables. The data was also used to evaluate whether households purchased more fruits and vegetables than were provided for through the cash value vouchers. Redemption of most WIC foods did not change from baseline to 18 months after the 2009 food package change. At 18 months after the 2009 food package change, 63.2 percent of WIC households purchased more fruits and vegetables than were provided for by the cash value vouchers, up from 56 percent at 6 months ( $p < 0.0001$ ). These increases were observed among Hispanic ( $p < 0.001$ ), non-Hispanic White ( $p < 0.0001$ ), and non-Hispanic Black households ( $p < 0.05$ ), but not among the other groups. Increases were greatest for participants who were children or pregnant women ( $p < 0.0001$  and  $p < 0.01$ , respectively).

Although the evidence was indirectly related to the Key Question, we concluded that the 2009 food package change was likely associated with greater purchasing of healthier foods and reduced purchasing of less healthy foods. The SOE was moderate based on medium limitations of the studies and the consistency and precision of the findings. Only one study used WIC benefit redemption data and examined whether WIC households made full, partial, or zero percent use of their benefits when purchasing foods or using their cash value vouchers for fruits and vegetables. The analysis was limited in that it presented an unadjusted description of food benefit redemption patterns over time by food package type and by race/ethnicity. Thus, no conclusions are drawn regarding the 2009 food package change and benefit redemption. See Appendix D, Evidence Tables D-135 through D-138 for details.

## **Findings From Qualitative Studies About Child Dietary Outcomes**

Five qualitative studies sought to understand purchasing practices and benefit redemption related to child WIC participation and eligibility.<sup>21, 119-122</sup> One study used a think-aloud methodology (verbalization with task performance at grocery stores) to capture real time decision making among 28 parents of preschool-aged children participating in Delaware WIC.<sup>119</sup> The study found that WIC eligible food items drove shopping patterns, and in some cases changed feeding practices. For example, one parent stated that “... it’s 1% milk with the WIC. When I didn’t get WIC, I was drinking 2% and giving them [the children] 2%.” Similarly, focus group participants attending Wisconsin WIC after the 2009 food package change reported liking some but not all of the changes. For example, participants stated that they liked the addition of beans (as a possible replacement for peanut butter) and had no problem buying whole wheat bread or tortillas. However, despite using their WIC benefits to purchase it, many reported dissatisfaction with the change to lower fat milk, thinking it was less healthy for their children.<sup>21</sup> Another study in Phoenix, AZ<sup>120</sup> conducted eight focus groups to explore perceived barriers related to addition of the WIC fruit and vegetable benefit. Participants (N=41) included caregivers who were primarily responsible for buying and preparing food for their households. Caregivers reported multiple barriers at the store, including negative interactions with staff and staff confusion over WIC food purchasing rules (e.g., what fruits and vegetable were allowed vs. not). Among experienced WIC shoppers, strategies emerged to deal with these barriers and maximize the value of their fruit and vegetable benefits, including use of reward points and strategic choice of shopping times and locations. Findings from in-depth interviews<sup>121</sup> conducted with caregivers of infants enrolled in WIC across eight clinics in Illinois found that caregivers valued the infant food package over other WIC food packages but noted that the addition of the fruit and vegetable cash voucher increased the value of many of the packages. Finally, a study<sup>122</sup> of Latino caregivers recruited from a community health center in Northern California used semi-structured interviews (N=29) to understand beliefs related to beverages consumption among infants and toddlers. Some caregivers reported that mixed messages from WIC led to confusion; for example, parents were told to avoid fruit juice, but then it was given to them by WIC, or included on the list of WIC eligible items. See Appendix D, Evidence Table D-139 for details.

## **Child Development and Academic Achievement Outcomes**

Six studies overall (two cohort studies, two cross-sectional studies, and one study which employed cohort and cross-sectional analyses) reported on the association of WIC participation with the outcomes of child development or academic achievement.<sup>47, 62, 63, 123-125</sup> The summary of findings and SOE for the outcomes are presented in Table 18. The studies were too

heterogeneous (in terms of study design, study population, and outcome measures) to support a meta-analysis. See Appendix D, Evidence Tables D-270 through D-276 for details.

**Table 18. Summary of evidence on whether infant and child development outcomes were associated with WIC participation compared with non-participants eligible for WIC**

| Outcome                      | Number of Studies and Participants (N)   | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>   |
|------------------------------|--|---|---|---|
| <b>Cognitive development</b> | <ul style="list-style-type: none"> <li>1 cross-sectional study of preterm children up to 24 months corrected age (71)<sup>63</sup></li> <li>1 cohort study of children ages 12 to 24 months (1,525)<sup>125</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Child WIC and WIC plus SNAP participants up to 24 months of age had higher adjusted mean cognitive development scores than non-participants</li> <li>Children enrolling in WIC at 12 months showed a greater improvement in overall development scores (Bayley Scales of Infant Development III) compared to those who left WIC at 12 months, but there was no difference in cognitive development sub-scores.</li> </ul>  | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Inconsistent</li> <li>Precision: Imprecise</li> </ul> |
| <b>Cognitive development</b> | <b>2 cohort studies</b> <ul style="list-style-type: none"> <li>1 difference-in-differences analysis of cohort study comparing data from 2006–2011 of maternal-child dyads; outcomes measured at ages 12, 24 months and ages 4–6 years (1,222)<sup>62</sup></li> <li>1 national birth cohort study of children (6,120)<sup>124</sup></li> </ul> | <ul style="list-style-type: none"> <li>Maternal WIC participation was associated with greater cognitive development scores on Bayley Scales of Infant Development. No significant difference was found in Stanford-Binet Intelligence Scale scores in the children at ages 4–6 years.<sup>62</sup></li> <li>In a matched pairs analysis, maternal WIC participation was associated with higher cognitive development z-scores on Bayley Scales of Infant Development mental development scores at age 2 years.<sup>124</sup></li> </ul> | Maternal WIC participation may be associated with higher cognitive development scores in early childhood. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Consistent</li> <li>Precision: Precise</li> </ul>            |

| Outcome                                    | Number of Studies and Participants (N)  | Study Results   | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>  |
|--|---|---|---|--|
| <b>Social development</b>                  | <ul style="list-style-type: none"> <li>1 cohort study of children ages 12–24 months (372)<sup>123</sup></li> </ul>  | <ul style="list-style-type: none"> <li>Using a within-child fixed effects analysis, child WIC participation was not associated with changes in social development measures (subdomains of the Brief Infant Toddler Social Emotional Assessment scales) from 12 to 24 months.</li> </ul>   | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>•Study limitations: Medium</li> <li>•Directness: Direct</li> <li>•Consistency: Unknown</li> <li>•Precision: Imprecise</li> </ul>   |
| <b>Social development</b>                  | <ul style="list-style-type: none"> <li>1 difference-in-differences analysis of cohort study comparing data from 2006–2011 of maternal-child dyads; outcomes measured at ages 12 and 24 months (1,222)<sup>62</sup></li> </ul> | <ul style="list-style-type: none"> <li>Maternal WIC participation was not associated with significant differences in social development scores on the Brief Infant Toddler Social Emotional Assessment Problem and Competency scale at ages 12 or 24 months.</li> </ul>   | Maternal WIC participation may be associated with no differences in measures of child social development in early childhood | Low <ul style="list-style-type: none"> <li>•Study limitations: Medium</li> <li>•Directness: Direct</li> <li>•Consistency: Unknown</li> <li>•Precision: Precise</li> </ul>              |
| <b>Motor development</b>                   | <ul style="list-style-type: none"> <li>1 cross-sectional study of preterm children up to 24 months corrected age (71)<sup>63</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Child WIC and WIC plus SNAP participants up to age 24 months had mean scores on motor development measures that were similar to non-participants.</li> </ul>   | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>•Study limitations: High</li> <li>•Directness: Direct</li> <li>•Consistency: Unknown</li> <li>•Precision: Imprecise</li> </ul>     |
| <b>Communication and adaptive behavior</b> | <ul style="list-style-type: none"> <li>1 cross-sectional study of preterm children up to 24 months corrected age (71)<sup>63</sup></li> <li>1 cohort study of children ages 12 to 24 months (1525)<sup>125</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Child WIC and WIC plus SNAP participants had significantly higher adjusted mean scores on measures of communication and adaptive behavior at age 24 months.</li> <li>Greater positive change in receptive and expressive communication scores (Bayley Scales of Infant Development III) from 12 to 24 months for those who enrolled in WIC from 12 to 24 months, compared to those who left WIC at 12 months.<sup>b</sup></li> </ul> | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>• Study limitations: High</li> <li>•Directness: Direct</li> <li>•Consistency: Consistent</li> <li>•Precision: Imprecise</li> </ul> |

| Outcome                                    | Number of Studies and Participants (N)  | Study Results  | Conclusion  | Strength of Evidence (Rationale) <sup>a</sup>  |
|--|---|--|---|--|
| <b>Communication and adaptive behavior</b> | <ul style="list-style-type: none"> <li>1 difference-in-differences analysis of data from a cohort study comparing data from 2006–2011 of maternal-child dyads; outcomes measured at ages 12 and 24 months (1,222)<sup>62</sup></li> </ul> | <ul style="list-style-type: none"> <li>Maternal WIC participation was not associated with significant differences in measures of communication and adaptive behavior at 24 months.</li> </ul>  | Maternal WIC participation may be associated with no significant differences in measures of child communication and adaptive behavior in early childhood. | Low <ul style="list-style-type: none"> <li>Study limitations: Medium</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul>                      |
| <b>Developmental risk</b>                  | <ul style="list-style-type: none"> <li>1 cross-sectional study of children ages 4–36 months (12,624)<sup>47</sup></li> </ul>  | <ul style="list-style-type: none"> <li>Child WIC participation did not attenuate the association between stressors (household food insecurity and maternal depressive symptoms) and childhood developmental risk.</li> </ul>   | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Indirect<sup>c</sup></li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul> |
| <b>Academic achievement</b>                | <ul style="list-style-type: none"> <li>1 cross-sectional study (263 sibling pairs)<sup>124</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Comparing outcomes of siblings with discordant maternal WIC participation, children of mothers exposed to WIC had higher reading (broad reading and passage comprehension) scores at age 11 years and higher math achievement scores, though the differences were not significant.</li> </ul> | Inconclusive  | Insufficient <ul style="list-style-type: none"> <li>Study limitations: High</li> <li>Directness: Direct</li> <li>Consistency: Unknown</li> <li>Precision: Precise</li> </ul>               |

SNAP = Supplemental Nutrition Assistance Program; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>a</sup>Low strength of evidence indicates limited confidence that the estimated association lies close to the true association, and insufficient strength of evidence indicates that evidence is unavailable or does not permit a conclusion;

<sup>b</sup>The study assessed whether having or not having or switching WIC participation between 12 and 24 months is associated with change in developmental measures between 12 and 24 months;

<sup>c</sup>The study examined whether WIC participation attenuated the relationship between stressors and developmental risk, not WIC impact on developmental risk.

## Child Development: Cognitive, Social, Motor, Communication, and Adaptive Behavior, Development Risk

Four studies reported on the association between WIC participation and cognitive development<sup>62, 63, 124, 125</sup>, two studies examined maternal WIC participation,<sup>62, 124</sup> and two studies examined child WIC participation.<sup>63, 125</sup> One study examining maternal WIC participation used data from the CANDLE longitudinal cohort study based in Tennessee (which enrolled 1,503 pregnant women from 2006–2011). Specifically, this study examined 1,222 maternal-child dyads and employed a difference-in-differences analysis to examine how maternal receipt of WIC was associated with various developmental outcomes inclusive of cognitive development, compared

with WIC-eligible non-participation.<sup>62</sup> This study found an association between maternal receipt of the WIC food package and cognitive development (Bayley Scales of Infant Development [BSID] cognitive composite score) at 24 months of age; the cognitive scores for children of WIC participants was 4.34; 95% CI, 1.11 to 7.57 higher than that for children of mothers who did not participate in WIC. Given an SD in the score of 15, this represents a difference of 0.28 SD, which is meaningful at the population level. However, no difference was seen on measures of cognitive development at 4 to 6 years of age using the Stanford-Binet Intelligence Scales. A second study used data from the Early Childhood Longitudinal Study and compared child cognitive development by maternal WIC participation after matching on socioeconomic characteristics, maternal education and smoking, and reading to the child.<sup>124</sup> Maternal WIC participation was associated with statistically significantly stronger cognitive development measures at 2 years of age (Bayley mental development z-scores;  $\beta$ , 0.0625; SE, 0.03;  $p < 0.05$ ). We concluded that maternal WIC participation may be associated with improved child cognitive development outcomes, with low SOE taking into consideration the medium limitations of the two available studies.

The association between child WIC participation and cognitive development was examined in the longitudinal cohort study which also examined CANDLE study data<sup>125</sup>. This study examined the impact of change in WIC participation between 12 and 24 months of age on change in aggregate scores and cognitive development measures (BSID third edition (BSID-III)). This study found that children enrolling in WIC at 12 months had a greater change (improvement) in aggregate scores from 12 to 24 months compared to children leaving WIC at 12 months (WIC-associated change in aggregate BSID III,  $\beta$ , 0.168; SE 0.104), though this was significant only at the  $p = 0.10$  level. This same comparison found non-significant differences in the change in cognitive scores from 12 to 24 months (WIC-associated change in BSID III cognitive scores  $\beta$ , 0.022; SE 0.120). A cross-sectional study assessed 71 preterm infants (gestational age less than 37 weeks) up to 24 months of age from a high-risk infant clinic (2013–2015).<sup>63</sup> The study found that mean adjusted cognitive development scores were significantly higher for child WIC participants than non-WIC children and higher for child participants in WIC and SNAP than children not enrolled in both programs (BSID III scores;  $\beta$ , 11.7, 95% CI, 1.2–22.2, for WIC participants;  $\beta$ , 11.5, 95% CI, 0.1 to 22.9, for WIC and SNAP participants). The SOE was insufficient to determine whether child WIC participation was associated with cognitive development outcomes, given medium study limitations and that one of the two available studies only evaluated the association in a specific, high-risk population subset (preterm infants).

Two studies examined social development outcomes in children, one examining maternal WIC participation<sup>62</sup> and one examining child WIC participation.<sup>123</sup> The study that examined maternal WIC participation<sup>62</sup> used difference-in-differences analysis to examine the interaction between maternal receipt of the revised food package and various development measures, including social development. No differences were found by maternal WIC participation in child social development scores at 12 or 24 months of age (Brief Infant Toddler Social Emotional Assessment [BITSEA] Problem and Competency subdomain scores). We concluded that maternal WIC participation may be associated with no differences in measures of child social development in early childhood. The SOE was low based on one study with medium study limitations.

One study examined the association of child WIC participation with change in social development from 12 to 24 months using BITSEA.<sup>123</sup> Employing a within-child fixed effects

analyses, BITSEA scores among 372 children were not significantly different by child WIC participation status (at 24 months BITSEA Competence subdomain coefficient 0.22; SD, 0.39; BITSEA Problem subdomain coefficient -0.58; SD, 0.79). Further, no significant association was seen in a subgroup of children who had been exposed to WIC prenatally (Competence subdomain coefficient 0.27, SD 0.40; Problem subdomain coefficient -0.60, SD 0.83). Because the question addressed in this study was regarding change in WIC participation with change in social development over a year period, we regarded the study results with caution. Therefore, the SOE was insufficient to support a firm conclusion about whether child WIC participation was associated with child social development measures because of the medium limitations of one study examining changes in WIC participation and social development over a 12-month period.

Child communication and/or adaptive behavior were examined in three studies, one that reported on the association with maternal WIC participation<sup>62</sup> and two that examined the association with child WIC participation.<sup>63, 125</sup> In the study using difference-in-differences analysis<sup>62</sup>, no significant interaction was found between maternal WIC participation and measures of child communication at 24 months of age (BSID;  $\beta$  coefficient for the interaction for Receptive Communication subtest: -0.21, 95% CI, -0.91 to 0.49; for Total Language subtest: -0.39; 95% CI, -4.13 to 3.35). We concluded that maternal WIC participation may be associated with no differences in measures of child communication or adaptive behavior. The SOE was deemed low given that there was only one available study with medium limitations.

The association of child WIC participation and measures of communication were examined in a cohort study (of 1525 children from the CANDLE study)<sup>125</sup>. This study found a greater increase (improvement) in receptive communication scores between 12 and 24 months among children who enrolled in WIC at 12 months compared to those who left WIC at 12 months (BSID-III;  $\beta$  coefficient for WIC-associated difference in receptive communication: 0.346, SE 0.120); but the difference was not significant for measures of expressive communication (BSID-III WIC-associated  $\beta$  coefficient for expressive communication: 0.127, SE 0.104). The association of child WIC participation and adaptive behavior was examined in a cross-sectional study of 71 preterm infants<sup>63</sup>, which found that the mean adjusted measure of adaptive behavior in children up to 24 months of age was significantly higher for WIC children than non-WIC children and higher for participants in WIC and SNAP than children not in both programs (Vineland Adaptive Behavior Scales, second edition, scores:  $\beta$ , 10.1, 95% CI, 1.9 to 19.1, for WIC participants;  $\beta$ , 10.3, 95% CI, 0.9 to 19.7, for WIC and SNAP participants). Given an SD of 15 points for the Vineland scale, these are large differences and likely clinically relevant. However, owing to high study limitations, we concluded that the SOE was insufficient to support a conclusion about whether child WIC participation was associated with measures of child communication or adaptive behavior.

The study among preterm infants<sup>63</sup> also examined motor development measures in children up to 24 months of age, using the Bayley Scales' Composite Motor Score. No significant differences were noted between children participating in WIC versus those not participating in WIC or children participating in WIC and SNAP versus those not participating in both programs. The SOE was insufficient to support a conclusion about child WIC participation and motor development outcomes because there was only one study whose limitations included being limited to analysis of a high-risk subset of children.

One cross-sectional study examined whether child WIC participation attenuated the adverse impact of stressors (household food insecurity and maternal depressive symptoms) on child developmental risk using Children's Health Watch Data from 2000 to 2010 for 29,650 children 4

to 36 months of age.<sup>47</sup> Developmental risk was defined as one or more caregiver-reported developmental concerns on the Parents Evaluation of Developmental Status questionnaire. Child WIC participation did not attenuate the association between number of stressors and developmental risk (for 2 vs. 0 or 1 stressor: WIC participant adjusted OR, 2.12, 95% CI, 1.79 to 2.51; WIC non-participant adjusted OR, 2.03, 95% CI, 1.32 to 2.11). The SOE was insufficient to evaluate the association of WIC participation with developmental risk given the only available study's limitations, which included indirect examination of this association. See Appendix D, Evidence Tables D-270 through D-275 for details on the developmental outcomes.

## **Academic Achievement**

One study evaluated academic achievement measures associated with WIC participation.<sup>124</sup> This study used Child Development Supplement data from the Panel Study of Income Dynamics (2007) to compare academic achievement among 263 children exposed to WIC in utero (maternal WIC receipt) with their WIC-unexposed siblings.<sup>124</sup> Woodcock-Johnson revised reading and math achievement test scores at 11 years of age were analyzed. Children exposed to WIC in utero had higher broad reading scores within family fixed effects (broad reading z-score coefficient 0.256; SD, 0.11;  $p < 0.05$ ), and higher passage comprehension (letter-word identification fixed effects coefficient 0.256; SD 0.12,  $p < 0.05$ ) than their WIC-unexposed siblings. WIC exposure was also associated with higher math achievement z-score, though the difference was not statistically significant (within-family fixed effects applied problems z-score coefficient 0.091, SD 0.12; between-family ordinary least squares coefficient 0.029, SD 0.11). Overall, measures of academic achievement (reading and math achievement scores at 11 years of age) were higher among children exposed to WIC in utero than among children who were not. The SOE was insufficient for this outcome because there was only one study, which had high limitations. See Appendix D, Evidence Table D-276 for details.

## **Findings From Qualitative Studies About Child Development and Academic Achievement**

No qualitative studies addressed the association of WIC with child development and academic achievement.

**Key Question 2a.** Does the association of infant and child outcomes with WIC vary by age at enrollment or duration of WIC participation?

## **Key Points**

- Duration of WIC participation may be positively associated with child diet quality (SOE: Low).
- The evidence was insufficient to determine whether age at WIC or the duration of WIC participation was associated with child health outcomes, infant or child mortality, anemia, child overweight and obesity, recovery from malnutrition, breastfeeding, or child development owing to the paucity of studies examining this question (SOE: Insufficient).

## **Infant and Child Health Outcomes**

No studies addressed the association of infant and child health outcomes by age at WIC or duration of WIC participation, with the exception of one study regarding recovery from anemia.



## Recovery From Anemia

One small prospective cohort study reported on the association of WIC participation with anemia.<sup>51</sup> This prospective cohort study examined the correlation between number of WIC visits and recovery from anemia (based upon measurement at the last WIC visit), using Massachusetts WIC program data from 1998–2010. Among 191 refugee children younger than 5 years of age who were diagnosed with anemia at their first WIC visit, a higher number of WIC visits (categorized as 5 or more vs. 2–4) was significantly associated with increased odds of recovery from anemia (adjusted OR, 6.50; 95% CI, 2.69 to 15.69), after adjusting for caregiver sociodemographic characteristics and child age, breastfeeding history, and birth weight. Because there was only one single-site study, which was further limited to a population of refugees, the evidence was insufficient to determine whether WIC participation was associated with anemia. See Appendix D, Evidence Table D-159 for details.

## Child Anthropometric Status

Studies explored whether the association of WIC participation and multiple child anthropometric outcomes varied by child age at WIC or duration of WIC participation. Studies evaluated child high weight status, including overweight and obesity; growth velocity; and recovery from malnutrition (low weight or length status).

## Child High Weight Status

Two studies directly assessed the association of duration of participation with high weight status (high WHZ, overweight, obesity),<sup>22, 23</sup> and two other studies provided indirect evidence as to whether the association between WIC participation and child high weight status, overweight, or obesity varied by age or duration of WIC participation.<sup>52, 56</sup> The most direct evidence comes from the results reported from the WIC Infant and Toddler Feeding Practices Study 2 (ITFPS-2)<sup>22, 23</sup> No difference in risk of overweight or obesity (differences in BMIz) among WIC participants at 3 or 4 years of age were found compared with those who participated until 2 or 3 years of age, respectively.

Results from WIC trend studies provide indirect evidence for the association between duration of WIC participation and child high weight status. These studies showed consistent declines in prevalence of overweight and obesity by age. In a study that examined trends in prevalence of overweight and obesity among WIC participating children 2 through 4 years of age from 50 states, the District of Columbia, and five United States territories from 2010 to 2016<sup>52</sup>, the adjusted prevalence of overweight/obesity and obesity decreased in the overall sample and among children 2, 3 and 4 years of age, respectively (adjusted prevalence difference of overweight/obesity among children 2 years of age: -3.0; 95% CI, -3.1 to -2.9; among children 3 years of age: -3.5; 95% CI, -3.6 to -3.4; among children 4 years of age: -3.3; 95% CI, -3.5 to -3.2).

Two studies that compared duration of exposure to the revised versus the pre-2009 food package also indirectly addressed the question about the effect of age at WIC participation. One study examined duration of revised versus pre-2009 food package exposure, characterized by age at receipt of the food package and the association with child overweight and obesity.<sup>56</sup> This longitudinal study of WIC participants in Los Angeles County, California examined obesity prevalence at 4 years of age, using matched samples of children who received a “full” dose (exposure to the food package from 0 through 4 years of age) or “late” dose (exposure to the food package from 2 through 4 years of age). Among boys, full or late exposure to the revised

food package was associated with lower obesity risk at 4 years of age; but, among girls, obesity risk was lower only among those receiving a full dose of the revised food package.<sup>56</sup>

The SOE was insufficient to determine whether increased duration of WIC participation was associated with differences in child overweight or obesity owing to a limited number of studies, some of which provided indirect evidence only, and varying definitions of duration used. See Appendix D, Evidence Tables D-170 and D-172 for details.

## **Growth Velocity**

No studies directly evaluated the association between duration of WIC participation and child growth velocity. Five studies provided indirect evidence, as they examined variations in WLZ or WHZ trajectories over age intervals or considered duration of exposure to types of WIC food packages.<sup>54-57, 61</sup> Three studies were longitudinal studies of WIC-participating children in Los Angeles County, California.<sup>54, 56, 57</sup> One study examined growth velocities over 6-month or 12-month periods to understand differences in obesity outcomes at 4 years of age associated with receipt of the revised versus the pre-2009 WIC food package.<sup>56</sup> Growth velocities did not differ during the first 6 months, but among both boys and girls, a slower velocity was found among those receiving the revised food package from 6 to 12 months of age; velocities after 1 year of age did not differ significantly. Among those who received the revised versus the pre-2009 food package from 2 through 4 years of age, differences in WHZ or BMIz velocities were only seen among boys at from 3 to 4 years of age, with slower growth velocities associated with receipt of the revised food package. Another study compared growth patterns over time by the duration of receipt of the fully breastfeeding package,<sup>57</sup> which was associated with differences in growth velocities over time. The association varied by age interval. With longer exposures, faster growth velocities were seen from 0 to 6 months of age, but slower velocities were seen at 6 to 12 months of age, and lower mean WLZ at 1 to 2 years of age.

In a study that explored growth velocity differences by type of infant food package and revised versus pre-2009 food package,<sup>55</sup> WLZ velocities were slower from 6 to 12 months of age for infants receiving the revised mostly breastfed, mostly formula fed, or fully formula fed groups. No differences over age intervals were found in the fully formula fed subgroup. A related study that followed up on infants receiving the fully formula feeding package<sup>54</sup> also examined the association between duration of receipt of the revised food package on WLZ or WHZ trajectories and mean WLZ or WHZ differences across age intervals. It found small and largely non-significant differences in both the trajectory and mean WHZ across certain age intervals and by duration of receipt of the revised food package.

In analyses that evaluated the modifying effect of initial WLZ status on the association of exposure to the revised or pre-2009 food package, outcomes were assessed across yearly intervals.<sup>61</sup> One difference noted by child age was among children in the high WLZ stratum, where mean WLZ was lower for boys receiving the revised versus pre-2009 food package across ages 1 to 5 years; but, among girls, the mean WLZ was lower only at 1 year of age.

Taken together, these results provide some indication of differential WLZ responses to the revised food package in late infancy, which is indirect evidence that growth velocity outcomes vary by age at WIC enrollment and the potential importance of WIC participation during infancy. However, these associations vary by type of revised food package, which is related to caregiver breastfeeding decision making and not the program. Without comparative data from WIC-eligible non-participants, no conclusion can be drawn. Therefore, the evidence was insufficient as to whether the association of WIC participation with growth velocity varies by age

at enrollment or duration of participation. See Appendix D, Evidence Table D-169 and D-170 for details.

## **Recovery From Malnutrition**

One small study evaluated associations of WIC participation with anthropometric outcomes among refugee children in Massachusetts from 1998 to 2010.<sup>51</sup> Of those who entered the program with low WAZ (less than -2), the study reported no significant association between number of WIC visits and recovery (WAZ greater than or equal to -2), with adjusted OR for at least five visits versus two to four visits of 1.73 (95% CI, 0.31 to 9.76). For those who entered with stunting (height-for-age z-score less than -2) and who had five or more WIC visits, there were significantly higher odds of recovery from stunting (height-for-age z-score greater than or equal to -2) compared with children with two to four total WIC visits (adjusted OR, 12.1; 95% CI, 2.82 to 52). The SOE was insufficient to determine whether duration of WIC participation was associated with recovery from malnutrition. See Appendix D, Evidence Table D-175 for details.

## **Breastfeeding**

No studies assessed association of duration of WIC participation and breastfeeding.

## **Child Dietary Outcomes**

Three studies used the longitudinal data from the WIC ITFPS-2 study to assess whether diet quality differed by duration of WIC participation.<sup>22, 104, 105</sup> In two reports, duration of WIC participation was categorized as high, medium, or low based on the number of times participants reported receiving WIC benefits; and, in one study,<sup>22</sup> six different participation patterns were identified. In adjusted analyses at 24 months of age, children in the high duration group had better overall diet quality (HEI-2015, 59.3 vs. 55.3,  $p<0.05$ ) than children in the low duration group, corresponding with greater intakes of vegetables ( $p=0.007$ ), greens and beans ( $p=0.0002$ ), seafood and plant protein ( $p=0.005$ ), refined grains ( $p=0.024$ ), and saturated fat ( $p=0.012$ ).<sup>105</sup> At 3 and 4 years of age, those who were still participating in WIC were more likely to meet the added sugars moderation component of the HEI.<sup>22</sup> Despite the consistency of the findings and the medium limitations of the studies, because the three studies are reports from the same data source, we conclude that the SOE was low that duration of WIC participation was positively associated with diet quality. See Appendix D, Evidence Table D-187 for details.

## **Child Development and Academic Achievement**

No studies addressed the association of child development or academic achievement by age at WIC or duration of WIC participation.

**Key Question 2b.** Does the association of infant and child outcomes with WIC vary by participant factors such as age of the mother at delivery, race/ethnicity of mother, geographic location (e.g., region, urban vs. rural),

education of the mother, employment status of the mother, marital status, or housing (e.g., public, homeless)?

## **Key Points**

- The association between maternal WIC and lower infant mortality may not vary by race or ethnicity (SOE: Low).
- The evidence was insufficient to draw conclusions regarding how participant factors relate to the association of WIC participation with child healthcare utilization, immunizations, anthropometric status, or breastfeeding (SOE: Insufficient).

## **Infant and Child Health Outcomes**

No studies addressed whether there is a differential association of infant and child health outcomes by WIC participant characteristics, with the exception of one study regarding maternal WIC participation and infant mortality by maternal race and ethnic groups.

### **Infant and Child Mortality**

One study assessed the association of infant mortality with maternal WIC participation stratified by race and/or ethnicity.<sup>30</sup> This national cohort study used birth certificate data and showed that the difference between WIC participation and non-participation in infant mortality was consistent among different subgroups by race and ethnicity (non-Hispanic White: adjusted OR, 0.90; 95% CI, 0.87 to 0.93, non-Hispanic Black: adjusted OR, 0.91; 95% CI, 0.87 to 0.95, and Hispanic: adjusted OR, 0.85; 95% CI, 0.81 to 0.90).<sup>30</sup> The evidence from this single study suggests no difference by race or ethnicity in the association of WIC participation with infant mortality reduction. The SOE was low because it is from one study with medium limitations and precise estimates. See Appendix D, Evidence Table D-154 for details.

### **Child Anthropometric Status**

No studies addressed whether there is a differential association of child anthropometric status outcomes by WIC participant characteristics, with the exception of two studies which indirectly assessed whether the association between exposure to the revised food package and high weight status varied by race and ethnic groups.

### **High Weight Status**

One study examined trends in prevalence of overweight and obesity among WIC-participating children 2 to 4 years of age from 50 states, the District of Columbia, and five U.S. territories from 2010 to 2016<sup>52</sup>. In that study, the prevalence of overweight/obesity and obesity decreased in the overall sample and in racial and ethnic subgroups (adjusted prevalence difference of overweight/obesity: non-Hispanic White: -0.7; 95% CI, -0.8 to -0.6; non-Hispanic Black: -1.2; 95% CI, -1.3 to -1.1; Hispanic: -2.8; 95% CI, -2.9 to -2.7; American/Indian/Alaska Native: -2.4; 95% CI, -3.0 to -1.9; Asian/Pacific Islander: -2.4; 95% CI, -2.6 to -2.2). This study suggests that the association between exposure to the revised food package and lower prevalence of overweight and obesity is consistent across the racial and ethnic groups studied. However, the evidence was insufficient to draw a conclusion because the only available study provided only indirect evidence about Key Question 2b. See Appendix D, Evidence Table D-171 for details.

## Breastfeeding

One study in South Carolina (2004–2013) examined WIC participation and breastfeeding initiation and presented results stratified by maternal race.<sup>24</sup> Among Black women, WIC participation was associated with a 2.76 percent (SE, 0.57%) higher rate of breastfeeding initiation, whereas in White women no significant difference in initiation by WIC participation was found (1.2% [SE, 0.56%]). When considering all South Carolina births during the time period, and adjusting for maternal and child characteristics, year of birth, and multiple pregnancies with women over time (but not income or Medicaid use), WIC participation was associated with a statistically significant 2.54 percent (SE, 0.46) higher rate of breastfeeding initiation for Black women and no difference in breastfeeding initiation (-0.45, SE, 0.34) among White women. In contrast, a national study used NIS data and an instrumental variable approach to address selection bias in analyses stratifying by race and ethnicity and found no difference in breastfeeding initiation by WIC participation in any subgroups.<sup>68</sup>

Several studies evaluated associations between exposure to the revised food package and breastfeeding outcomes by racial and ethnic groups. A prospective cohort study using New York Pediatric Nutrition Surveillance System (PedNSS) reports from 2002 to 2015 assessed temporal trends in breastfeeding initiation and duration of more than 1 month.<sup>74</sup> Breastfeeding initiation increased significantly, from 62.0 percent in 2002 to 83.4 percent in 2015, with an annual percent change of 2.4, or an average of 1.7 percentage points, per year. Stratifying by maternal race and ethnicity, the study reported the largest increase in breastfeeding initiation for Asian infants, from 45.8 percent in 2002 to 84.7 percent in 2015. The racial/ethnic disparity in breastfeeding initiation rate (i.e., the difference between the highest and the lowest rates among White, Black, Hispanic and Asian infants in a particular year) was reduced from 26.5 percentage points in 2002 (Hispanic vs. Asian) to 9.2 in 2015 (Hispanic vs. White). In addition, all breastfeeding duration trends by race/ethnicity demonstrated significant improvements for breastfeeding duration of 1 month or more, with the largest increase occurring among Asians. Because the evidence suggested no difference in breastfeeding initiation with exposure to the revised food package, the revised food package may have differentially benefited breastfeeding outcomes for specific race groups. The findings across multiple studies of predominantly Hispanic women in Los Angeles County, California suggested positive findings for the association between the 2009 food package change and breastfeeding initiation and exclusivity. The one study with direct evidence and the multiple studies with indirect evidence suggested that WIC participation may be associated with differential improvement over time in breastfeeding outcomes by maternal racial and ethnic groups. However, the evidence was insufficient to draw conclusions with respect to Key Question 2b for these outcomes because of the limitations of the studies and the indirect nature of most of the evidence. See Appendix D, Evidence Tables D-180 and D-182 for details.

## Child Dietary Outcomes

No studies evaluated WIC participation and dietary outcomes by race or ethnic groups. However, four studies evaluated the association indirectly by evaluating exposure to the revised versus the pre-2009 food package within specific race or ethnic groups.<sup>96, 98, 99, 101</sup> In one study that evaluated the dietary outcomes after 6 and 18 months of exposure to the revised food package, Hispanic children consumed more whole grains at 6 months after receiving the revised food package, and both Hispanic and African American children consumed more low-fat milk

with corresponding reductions in whole milk across both time points ( $p<0.05$ ).<sup>98</sup> In addition, 18 months after receiving the revised food package, Hispanic children tended toward consuming more vegetables than prior to the 2009 food package change, but the difference was not statistically significant ( $p=0.08$ ).<sup>96</sup> Concurrently, African American children consumed more sugar-sweetened beverage after receiving the revised food package ( $p=0.03$ ).<sup>98</sup> Nutrient intakes were also assessed, with Hispanic children consuming a smaller percentage of energy from saturated fat (but not total fat) at 6 months after receiving the revised food package (-1.18%,  $p=0.01$ ) and both less saturated and total fat at 18 months after receiving the revised food package compared with the pre-2009 food package (-15%,  $p=0.0004$ ; 10.5%,  $p<0.05$ , respectively).<sup>96, 98</sup> Among Hispanic children, fiber intakes (g/1000 kcal) were higher at both 6 months and 18 months after receiving the revised food package compared with the pre-2009 food package ( $p=0.03$ ), but no differences were observed among African American children.<sup>96, 98</sup> One study provided findings on differences, after the 2009 food package change, in the food group intakes of Native American WIC participants 2 to 4 years of age.<sup>101</sup> With the revised food package, greater proportions of children were consuming fruits and vegetables, and the frequency of consumption of white bread decreased, while the frequency of consumption of wheat bread increased. Children 3 years of age showed a decrease in consumption of whole milk and an increase in consumption of low-fat milk. Finally, the numbers of predominantly Hispanic children in the Los Angeles County, California WIC program who consumed whole milk decreased by 63 percent after the 2009 food package change ( $p<0.001$ ) with corresponding increases in consumption of lower-fat milk ( $p<0.001$ ).<sup>99</sup>

The evidence was insufficient to draw conclusions about whether the association of WIC participation with dietary outcomes varies by race and ethnic groups owing to the indirect nature of the evidence and medium study limitations. However, studies of WIC-participating children in selected populations provided some evidence that the 2009 food package change may be associated with changes in food group intakes consistent with better diet quality for Hispanic and Native American children. See Appendix D, Evidence Tables D-194, D-196, D-203, D-205, D-217, D-226, D-235, D-236, D-249, D-250, D-260, D-262 through D-266 for details.

## **Child Development and Academic Achievement**

One study examined the association of child WIC participation with change in social development from 12 to 24 months of age.<sup>123</sup> Of the 327 children, 88% were African American, and no differences were seen by child WIC participation. When the sample was restricted to 286 African American children, no significant difference in BITSEA scores (competence subdomain coefficient 0.43; SD 0.42; problem subdomain coefficient -0.18; SD 0.80) was found by WIC participation. The evidence was insufficient to support a conclusion because it came from one study with medium limitations and imprecise estimates that was focused on changes in social development over a 12-month period. See Appendix D, Evidence Table D-275 for details.

# Discussion

## Findings in Relation to the Decisional Dilemmas

This systematic review synthesized recent evidence regarding the association of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) participation with key outcomes pertinent to decision making at the clinical, programmatic and policy levels. Many people need reliable information about the impact of WIC, including healthcare practitioners, public health professionals, and researchers, as well as WIC participants, staff, and leadership. In particular, policy makers at the local, state, and federal levels need such information to determine whether changes should be made in WIC programming to further improve outcomes for women and children. Two Key Questions guided this systematic review. Key Question 1 focused on the association between maternal participation in the WIC program and maternal, neonatal, and birth outcomes. Key Question 2 focused on the association of WIC participation with infant and childhood health and developmental outcomes. Overall, we found 98 studies that fit our inclusion criteria, of which 82 were quantitative observational studies and 16 were qualitative studies. A summary of the direct quantitative evidence regarding WIC participation and maternal and child outcomes is provided in Table 19.

**Table 19. Summary of direct evidence regarding association between WIC participation and outcomes<sup>a</sup>**

| Outcomes  | Evidence on Association Between WIC Participation and Outcomes   | Insufficient Evidence Despite one or more Studies  |
|---|--|--|
| <b>Maternal health outcomes (KQ1)</b>           | <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>• Lower likelihood of inadequate gestational weight gain (1 study<sup>24</sup>)</li> <li>• No difference in smoking during or after pregnancy (1 study<sup>25</sup>)</li> <li>• Less alcohol use in pregnancy (1 study<sup>25</sup>)</li> </ul>   | NA   |
| <b>Neonatal and birth outcomes (KQ1)</b>        | <p><b>Likely to be associated (Moderate SOE)</b></p> <ul style="list-style-type: none"> <li>• Less preterm birth (3 studies<sup>28-30</sup>)</li> <li>• Less infant low birth weight (2 studies<sup>28, 29</sup>)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>• No difference in perinatal death overall (1 study)<sup>28</sup></li> <li>• Lower risk of stillbirth in Black women (1 study)<sup>43</sup></li> </ul> | <ul style="list-style-type: none"> <li>• NICU admission and hospital length of stay (1 study<sup>29</sup>)</li> </ul>  |
| <b>Maternal dietary outcomes (KQ1)</b>          | <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>• Better diet quality during pregnancy (1 study<sup>32</sup>)</li> <li>• Greater intakes of total fruit during pregnancy (1 study<sup>32</sup>)</li> </ul>  | NA   |
| <b>Infant and child health outcomes (KQ2)</b>   | <p><b>Likely to be associated (Moderate SOE)</b></p> <ul style="list-style-type: none"> <li>• Lower infant mortality (2 studies<sup>30, 46</sup>)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>• Increased preventive care visits (1 maternal study<sup>48</sup>)</li> <li>• Increased immunizations (1 maternal study<sup>48</sup>, 2 child studies<sup>49, 50</sup>)</li> </ul>                                     | <ul style="list-style-type: none"> <li>• Morbidity - health status, hospitalization (1 child study<sup>47</sup>)</li> </ul>  |
| <b>Child growth anthropometric status (KQ2)</b> | NA   | <ul style="list-style-type: none"> <li>• Child weight status (1 study<sup>47</sup>)</li> <li>• Attained weight, length or head circumference (1 maternal study<sup>62</sup>) (1 child study<sup>63</sup>)</li> </ul> |

| Outcomes  | Evidence on Association Between WIC Participation and Outcomes   | Insufficient Evidence Despite one or more Studies   |
|---|--|---|
| <b>Breastfeeding outcomes (KQ1 &amp; KQ2)</b>           | <p><b>Likely to be associated (Moderate SOE)</b></p> <ul style="list-style-type: none"> <li>No difference in breastfeeding initiation rates (6 studies.<sup>24, 67-71</sup>)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>No difference in introduction of solids before 4 months (1 study<sup>72</sup>)</li> </ul>   | <ul style="list-style-type: none"> <li>Breastfeeding duration (2 studies<sup>69, 71</sup>)</li> <li>Breastfeeding exclusivity (1 study<sup>67</sup>)</li> </ul>   |
| <b>Child dietary outcomes (KQ2)</b>                     | <p><b>Likely to be associated (Moderate SOE)</b></p> <ul style="list-style-type: none"> <li>Child better diet quality measured by the Healthy Eating Index 2010 (2 studies<sup>88, 91</sup>)</li> <li>Child higher food group intakes of 100% fruit juice, whole grain cereals, and age-appropriate shifts from whole milk to lower fat milk. (4 studies<sup>89, 92-94</sup>)</li> <li>Household purchasing of healthy food groups and reduced purchasing of less healthy foods and beverages (6 studies<sup>109-113, 118</sup>)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>Child higher nutrient intakes of vitamin D and iron, and after age 2, with meeting recommendations to limit saturated fat. (2 studies<sup>90</sup>)<sup>94</sup></li> </ul> | <ul style="list-style-type: none"> <li>Child diet quality measured by the Toddler Diet Quality Index<sup>94</sup></li> <li>Child vegetable and fruit intake (5 studies<sup>89, 92-95</sup>)</li> <li>Diet quality/ food group/ nutrient intakes of women in WIC households (1 study<sup>108</sup>)</li> </ul>   |
| <b>Child development and academic achievement (KQ2)</b> | <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>Maternal participation and better child cognitive development (2 studies<sup>62, 124</sup>)</li> </ul> <p><b>May be associated (Low SOE)</b></p> <ul style="list-style-type: none"> <li>No difference in maternal participation and child communication and adaptive behavior (1 study<sup>62</sup>)</li> <li>No difference in maternal participation and differences in measures of child social development (1 study<sup>62</sup>)</li> </ul>   | <ul style="list-style-type: none"> <li>Child participation and cognitive development (2 studies<sup>63, 125</sup>)</li> <li>Child participation and social development (1 child WIC study<sup>123</sup>)</li> <li>Child participation and motor development (1 study<sup>63</sup>)</li> <li>Child participation and communication and adaptive behavior (child WIC 2 studies<sup>63, 125</sup>)</li> <li>Child participation and developmental risk (1 study<sup>47</sup>)</li> <li>Child participation and academic achievement (1 study<sup>124</sup>)</li> </ul> |

KQ= Key Questions; NA= not applicable; NICU = neonatal intensive care unit; SOE = strength of evidence; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children. <sup>a</sup>Moderate SOE indicates moderate confidence that the estimated association lies close to the true association, low SOE indicates limited confidence that the estimated association lies close to the true association, and insufficient SOE indicates that evidence is unavailable or does not permit a conclusion.

## Birth Outcomes and Infant Mortality

We found that maternal WIC participation is likely to be associated with lower risk of low birth weight and with lower risk of preterm birth. These findings confirm and extend the findings from the prior 2012 U.S. Department of Agriculture (USDA) review.<sup>5</sup> Here we report reductions in risk on the order of 11% to 24% for low birth weight and 10% to 15% for preterm delivery. Notably, one study reported that WIC participation was associated with a 10% decrease in preterm birth that was similar among the racial and ethnic groups studied.<sup>30</sup> In 1992, the Government Accounting Office Study (GAO HRD 92-18) reported a summary reduction in risk of 25% for low birth weight.<sup>126</sup> The USDA 2012 review – which reported only direction and statistical significance – and an earlier review by Bitler in 2005 indicated greater reductions in risk of low birth weight and preterm delivery on the order of 10-40%.<sup>5, 127</sup> Most of the studies identified in the current review and the prior reviews used analytic strategies to address selection bias and confounding.<sup>5, 127</sup> However, the pregnancies reported in the 2012 review<sup>5</sup> occurred



between 1988 and 2004 (overlapping with the GAO report). The risk estimates may be affected by differences over time in socioeconomic factors, who becomes pregnant, duration of pregnancy at enrollment in WIC, or access to and timing of entry into prenatal care (regardless of adjustment procedures). Most of the studies used Medicaid participation to identify WIC-eligible participants, and over time Medicaid expansion has altered the characteristics of the prenatal Medicaid population and the WIC versus eligible non-WIC comparison. Taken together, the evidence is remarkable for showing lower risk of adverse birth outcomes associated with WIC as a public health program providing guidance, referral, supplemental food, nutrition education, and enhanced support for high-risk pregnancies. Because the WIC program considers high-risk to include medically-based risks and diet-based risks such as inadequate dietary pattern and food insecurity,<sup>128</sup> WIC may provide unique support that contributes to prevention of adverse birth outcomes.

The authors of the 2012 review<sup>5</sup> suggested that the reduction in low birth weight was mainly due to a reduction in preterm delivery. In 2005, the Institute of Medicine estimated a societal economic cost of \$51,600 for each preterm birth.<sup>129</sup> An economic evaluation of California WIC, using updated cost figures and an estimated preterm birth relative risk of 0.7 for WIC,<sup>28</sup> demonstrated a total societal cost savings of \$46,118 per preterm birth prevented and a \$2.48 return for each \$1.00 spent on WIC.<sup>130</sup> Thus, evidence that WIC participation may be associated with improved birth outcomes implies that it could also lead to a reduction in healthcare costs and subsequent health complications in children given the known risks associated with low birth weight and prematurity.<sup>131</sup>

As part of Key Question 2, and based on two studies, we found new evidence that maternal WIC participation may be associated with lower risk of infant mortality. The association with infant mortality is consistent with the finding on both preterm delivery and low birth weight because both outcomes increase risk of infant death. In one national study of Medicaid births from 2011-2017,<sup>30</sup> which also reported a decreased risk of low birth weight, the overall adjusted risk reduction for infant mortality was 14% and similar (10% to 15%) for non-Hispanic Whites, non-Hispanic Blacks and Hispanic infants. For this outcome, we expanded our search to include studies published from 2000 onwards and included a study from Puerto Rico of births in 1994-95 which reported an adjusted 40 percent reduction in infant mortality. As noted above, Medicaid expansion and the changing Medicaid population will affect estimated effect size over time. The national study adjusted for sociodemographic characteristics, clinical risk factors, receipt of prenatal care, and maternal smoking, and such covariate adjustment tends to lower effect estimates compared with studies using vital records that have limited information on covariates.<sup>30</sup> A 10% to 15% reduced risk of infant mortality is meaningful at the population level. The Healthy People 2020 goal for infant mortality reduction was 10%; from 2006 to 2017, the infant mortality rate declined from 6.7 to 5.8 per 1000 live births, a 13.4% reduction.

## **Diet Quality**

### **Children**

The Healthy Eating Index (HEI) score is used to assess adherence to the Dietary Guidelines for Americans starting at 2 years of age. We found that WIC participation was associated with a 3- to 4- point higher total HEI score for children 2 to 4 years of age. Greater consumption of whole grains, fruits, vegetables, and low-fat milk after 2 years of age would be associated with higher total HEI scores. In studies we reviewed, WIC children had greater consumption of 100%

fruit juice, whole grain cereals, and age-appropriate shifts from whole milk to low-fat milk. These findings were mirrored in studies of the 2009 food package change among WIC children. The results regarding fruit and vegetable intake were mixed and thus we concluded there was insufficient evidence regarding the association of fruit and vegetable intake with WIC participation. None of the studies examined whether the recent implementation of electronic benefit transfers made it easier to use food benefits. Results from qualitative studies indicate greater barriers to redemption of benefits for fruits and vegetables than other WIC approved foods, which may explain the inconsistency of results for these food groups. Although the evidence is limited, we also report that longer duration of WIC participation may be associated with better overall diet quality as compared with shorter duration of participation.

Only a few studies in this review evaluated child WIC participation and nutrient intakes. We found evidence of higher iron intakes in younger children, higher vitamin D intakes across all ages, and lower saturated fat intakes among those 2 to 4 years of age. The prior 2012 review<sup>5</sup> also concluded that child WIC participation was associated with improved diet, based on higher intakes of vitamin and minerals (iron), and lower fat intakes among those 2 to 4 years of age. We included studies published into 2021 and our findings extend those of a systematic review of studies of child diet quality and the 2009 food package change published through 2014.<sup>132</sup>

The difference in total HEI scores between WIC participants and eligible non-participants is large, on the order of 0.3 to 0.4 SD, and reflects meaningful differences in diet quality compared with eligible non-WIC participants. Kirkpatrick et al. suggested that changes of 0.5 SD would constitute a moderate effect, but they also suggested that the scientific question and methodological issues may affect this judgment.<sup>36</sup> In 2011-2012, the mean HEI-2010 for WIC children in a national study<sup>91</sup> was 56, which was 4 points higher than the mean score for eligible non-participants, and only 3 points lower than the mean HEI-2010 score for the general population 2 years and older.<sup>133</sup> It is well understood that food preferences and dietary patterns are established early and tend to persist throughout childhood.<sup>134</sup> Poor diet quality is a contributor to excess weight, a condition that develops in early childhood and can track into adulthood.<sup>135, 136</sup> Thus, these findings, along with the finding that longer duration of WIC participation may be associated with better diet quality, indicate that WIC participation may be beneficial for establishing healthy dietary patterns and reduced risk of health outcomes associated with poor diet quality or excess weight.

## **Women**

We identified two dietary studies of pregnant women specifically, and several that focused on maternal caregivers of WIC children. These studies indicated that HEI scores are 2 to 3 points higher for WIC participants during pregnancy and 1 to 3 points higher for maternal caregivers of WIC children, with increased fruit intakes during pregnancy and greater consumption of whole grains, low-fat milk, and fruits and vegetables for maternal caregivers of WIC children. The magnitude of the difference in HEI is less than that reported for children, but the difference for maternal caregivers is of interest as they were not direct beneficiaries of WIC. This finding may be due to either prior WIC participation and nutrition education or shifts in household dietary intakes due to child WIC participation. The household purchasing studies provided evidence that WIC participation is associated with reduced purchasing of refined grains and increased purchasing of whole grains, reduced purchasing of whole milk, increased purchasing of low-fat milk, and although more variable – greater purchasing of fruits and vegetables. Several qualitative studies reported how WIC participation influences food purchases for the entire

household. Taken together, the evidence is fairly robust that WIC participation and exposure to the revised (current) food package are associated with improved diet quality of children, pregnant women, and women living in WIC households. These are new findings for dietary outcomes for women, not previously reported in earlier systematic reviews of the WIC Program.

## **Child Anthropometric Status or Growth Outcomes**

Child overweight and obesity are public health concerns in the United States. Although some earlier studies suggested that WIC participation was associated with overweight or obesity, the 2012 review was unable to draw conclusions between WIC participation and infant and child anthropometric outcomes.<sup>5</sup> Many components of the WIC food package were changed in 2009 to align with the Dietary Guidelines for Americans (DGA) and intended to reduce the likelihood of child overweight and obesity in the preschool years. Although many studies were identified for the review, we found few studies comparing risk of overweight and obesity in children 2 to 4 years between WIC participants and eligible non-participants. In contrast, we identified 14 studies that evaluated child high weight status, overweight and or obesity before versus after the 2009 food package change among child WIC participants, which we considered indirect evidence with respect to WIC participation. These studies suggested that the revised food package was associated with a lower risk of high weight status prior to age 2, and a 10 percent lower risk of overweight and obesity in children 2 to 4 years of age.

Through a set of pre-post package change studies of weight-for-length z-score (WLZ) growth velocity in child WIC participants matched on multiple characteristics, we summarized evidence that the revised food package was associated with slower (improved) WLZ growth velocity between 0 to 4 years. This finding may explain the lower risk of overweight and obesity in children 2 to 4 years associated with the revised food package. The studies identified a large reduction in WLZ from 6 to 12 months of age associated with the revised food package that was evident for all food packages other than the fully breastfed package (who were at lowest risk for overweight before and after the package change). These findings await replication in other WIC populations. Further research may unpack the pathways through which the 2009 food package change may be associated with slower WLZ growth velocity and lowered risk of later overweight and obesity.

Studies of national data of child WIC participants 2 to 4 years of age identified a change in the trends for the annual prevalence of child overweight and obesity from 2010 onwards, indicating a flattening and decline in the prevalence of overweight and obesity. One national study of the prevalence of high weight status (high weight-for-length) among WIC children 6 to 23 months of age reported a decline from 2010 to 2014 with a flattening through 2018.<sup>65</sup> Over this time period the prevalence of overweight and obesity for all children under 5 years of age declined from 2011 to 2014, but then increased through 2016.<sup>137</sup> Thus, the most recent trends for WIC children do not mirror the secular trends of the general population. What a 10 percent reduction in risk of overweight and obesity means for individual children 2 to 4 years of age is unclear, but overweight tends to track into adulthood. Thus, prevention during early childhood is important for long-term well-being. At the population level, small reductions in childhood obesity would be associated with reductions in risk of future obesity and may eventually lead to lower cardiovascular disease burden in adulthood.<sup>106, 138</sup>

## Breastfeeding Outcomes

In the 2012 review of the WIC program,<sup>5</sup> some evidence suggested that prior to 2009, WIC participants were less likely to breastfeed than eligible non-participants. In part, the 2009 food package changes and extension of maternal WIC participation postpartum were designed to enhance support for breastfeeding initiation and duration. Overall, the evidence presented here suggests only negligible differences in breastfeeding initiation between WIC participants and eligible non-participants. Across studies of breastfeeding initiation among WIC participants, the trends before and after the 2009 food package change also show no marked difference. With respect to the outcomes of breastfeeding duration and exclusivity, we found insufficient direct evidence with respect to WIC participation, but some evidence of greater breastfeeding exclusivity in studies of the 2009 food package change among WIC participants. Further, we found evidence that among WIC participants, receipt of breastfeeding support services was positively associated with breastfeeding duration.

Teasing out what WIC participation alone means for breastfeeding outcomes is difficult. The findings may be unexpected given the attention placed on breastfeeding promotion and support in the WIC program. However, it must be recognized that breastfeeding decisions are related to multiple factors including maternity leave policies, return to work, and flexibility in the workplace to support continued breastfeeding. That said, over the time period of assembled evidence, we found gradual upward trends in breastfeeding initiation, and to a lesser extent breastfeeding duration, with steady increases across multiple racial and ethnic groups. WIC services were in place prior to 2009 to support breastfeeding, including access to peer counselors and certified lactation consultants, prenatal education, and provision of breast pumps.<sup>139, 140</sup> Therefore, studies of the 2009 food package change evaluated breastfeeding outcomes associated with enhanced food packages for breastfeeding mothers and changes in formula provisions based on breastfeeding status. As suggested by results of the qualitative studies, there is diversity of opinion across women on the importance of the food package in their breastfeeding decision-making. Research among African-American women indicates an important role for WIC breastfeeding support services. Interpretation of the study findings is further complicated by the fact that the Surgeon General's Call to Action to Support Breastfeeding<sup>141</sup> was released in 2011 and led to comprehensive public health action to support breastfeeding. Further research is needed to evaluate the role of the WIC program in reducing breastfeeding disparities, but current evidence does not support concerns that WIC participants may be less likely to breastfeed as was suggested by earlier reports before the 2009 food package change.

## Child Health and Development Outcomes

As part of the WIC program, professionals inquire about pediatric care access and immunization status and make referrals for both services. Thus, WIC participation may be associated with small positive impact on these outcomes. Identified studies reported small positive associations between, for example, prenatal WIC participation and well-child visits, and child WIC participation and vaccine coverage. The evidence for either outcome is limited. More studies on healthcare utilization were conducted prior to 2009 and were included in the 2012 review.<sup>5</sup> Based on evidence from six studies, the 2012 review concluded that child and or maternal participation in WIC was associated with greater utilization of both preventive and curative healthcare services. In the 2012 review, based on three studies (one of which was included here), they considered the evidence insufficient to draw conclusions regarding WIC

participation and immunization coverage. Together this evidence points to the importance of the role played by WIC in service referrals.

WIC participation may be positively associated with child development through improved prenatal nutrition, birth outcomes, breastfeeding, and partnerships with organizations with a shared mission to promote child development (e.g., Head Start). The 2012 review identified only one 2008 study (dissertation) of WIC participation and child development, and it presented mixed findings for outcomes at 9 and 24 months.<sup>5, 142</sup> Based on the findings of two studies (one used a difference in difference analysis with covariate adjustment and the other used a maternal fixed-effects analysis), we concluded that maternal WIC participation may be associated with greater cognitive development scores. These findings could be related to the association between eWIC participation and lower risk of preterm delivery or low birth weight as these studies did not adjust for neonatal outcomes. Based on findings from one of these studies, we also concluded that maternal WIC participation may be associated with no differences in measures of communication and adaptive behavior in early childhood. The evidence was insufficient regarding child participation or other developmental outcomes during early childhood or academic achievement.

## **Maternal Health, Morbidity, and Mortality**

Multiple components of the WIC Program focus on supporting the nutrition and health of women during pregnancy, including referral to prenatal care, nutrition education and supplemental foods, and enhanced support for high-risk pregnancies. Despite evidence that maternal WIC participation was associated with improved birth outcomes and reduced infant mortality, a major finding of this review was the overall lack of studies evaluating maternal WIC participation and maternal health outcomes. For important outcomes of maternal mortality and morbidity, no studies were identified. There are multiple pathways through which WIC participation could contribute to lower pregnancy-related morbidity and mortality, and to reduced economic, racial, or ethnic disparities in these outcomes.<sup>143</sup> Although studies have been able to link birth and death records and information on WIC participation to evaluate infant mortality, none have linked data sources at scale to assess how WIC participation is related to maternal mortality. Most of the evidence regarding maternal morbidities (preeclampsia, gestational diabetes) was reported in one large, national pre-post study using a difference-in-differences analysis in which WIC participants were compared with the general population (of those eligible and not eligible for WIC).<sup>26</sup> Thus, the evidence was insufficient to draw conclusions regarding maternal WIC participation and the most important maternal health outcomes during pregnancy.

We did conclude that maternal WIC participation may be associated with a lower likelihood of inadequate gestational weight gain. The finding is plausible due to nutrition counseling provided by WIC or to small improvements in maternal diet quality during pregnancy, but the importance of relatively small reductions in the prevalence of inadequate weight gain is not well defined. Results from qualitative studies indicate that many prenatal care providers do not discuss gestational weight gain, and thus WIC may fulfill this gap, although some women discussed lack of consistency in the advice between healthcare providers and WIC. We did not find any studies of WIC participation and postpartum health or weight management, and only one study of maternal diet at one month postpartum. Given the continued eligibility of women to participate in WIC for 6 to 12 months postpartum, whether WIC participation can improve women's postpartum health and reduce obesity is an important area for research.

## Strengths and Limitations

This is the first systematic review to specifically address the association of WIC participation with a wide range of maternal and child outcomes and to consider evidence on how these outcomes are associated with the 2009 food package change. The evidence base on which to draw conclusions spans most of the United States. Published studies leveraged federal and state surveillance systems, vital statistics, and federal studies, and a significant proportion were investigator initiated. We included studies that compared outcomes between WIC participants and eligible non-participants as providing direct evidence regarding the Key Questions. We presented separately the studies conducted among WIC participants. These studies, which largely focused on differences in outcomes before and after the 2009 food package change, provided indirect evidence regarding the Key Questions about the association of outcomes with WIC participation compared to eligible non-participants. For child anthropometric outcomes and breastfeeding exclusivity, these studies provided evidence which was not otherwise available due to limited data sources comparing WIC participants with eligible non-WIC participants. For other breastfeeding outcomes and those related to child and household diet, the results supported the direct evidence. Presenting the results in separate tables and text clarifies the nature and types of evidence available while highlighting gaps in direct evidence on the Key Questions. We limited our search to studies with data since 2009 to provide the most current evidence available to address the Key Questions. We expanded our search for three outcomes (infant and maternal mortality, and child development) to include those with data since 2000. This strategy enabled us to include additional studies of infant mortality.

It is important to consider limitations in the evidence. First, none of the evidence on the Key Questions resulted from randomized controlled trials (RCTs) because WIC is a federal program funded to make it largely available to all of those who are eligible. Many people would consider it unacceptable to perform an RCT.<sup>144</sup> This is the major reason that none of the outcomes had high strength of evidence (SOE). Although observational studies typically do not meet criteria for a high SOE grade because of the potential risk of bias, it is not unusual for decisions about public health programs to be based on evidence without RCTs.<sup>144</sup> Most studies in this review used covariate adjustment, and some used stronger methods involving matched samples or propensity scoring, but we did include studies with differing degrees of covariate adjustment. This decision may have led to heterogeneous findings and lower SOE ratings. That said, a major limitation of the observational studies is risk of bias due to residual confounding. The distinction between moderate or low SOE depended on the number of studies, the study design, methodologic rigor, consistency of the findings, and appropriate adjustment to address confounding and/or selection bias. For some outcomes, the SOE was insufficient because studies did not directly assess the comparison between WIC participants and WIC-eligible non-participants. Second, many studies had a high risk of measurement bias for determining WIC exposure because exposure to WIC was based on self-reported WIC participation (either yes or no) at the time of the study with little clarification regarding benefit issuance or duration of participation. Third, the potential for selection bias must be acknowledged because income-eligible women, caregivers, and families decide whether or not to participate in WIC. Studies of WIC participation find that early entry and later exit from WIC are associated with greater economic disadvantage (among those who are WIC eligible) indicating the potential for negative bias in studies.<sup>13, 14, 16</sup> For example, those who chose to be in WIC longer may also be those who are at greatest risk of negative outcomes. In addition, some studies have reported that child retention in WIC may be associated with positive health behaviors (such as breastfeeding and

seeking support and nutritional advice).<sup>14, 15</sup> To address these biases as well as unmeasured confounding, analytic approaches can involve matching, propensity scoring, instrumental variables, or selecting for consecutive pregnancies or siblings. Although many studies used these approaches, small sample investigator-initiated studies relied on limited covariate adjustment and were identified as having high risk of bias. Thus, when considering the SOE, conclusions must balance evidence across studies with varying risk of bias. Because of the heterogeneity of studies with respect to study design, study population, comparisons, and measurement of outcomes, we were unable to synthesize the findings using meta-analysis. Finally, we did not assess potential reporting bias because of the lack of reliable methods for doing so with observational studies.<sup>145</sup>

The evidence had additional limitations with respect to specific outcomes. First, no studies were identified for some outcomes, and for some outcomes only one or two studies were identified. For some child outcomes only studies considering maternal WIC participation were identified. Some of the reasons for the paucity of evidence relate to limitations in the data sources that can be leveraged to study WIC. For example, to evaluate the outcome of maternal mortality, death records must indicate a cause, temporal relationship with pregnancy, WIC participation, and multiple covariates.<sup>146</sup> A second example is the lack of national sources of data that address questions regarding gestational weight gain, maternal morbidities, dietary outcomes during pregnancy and postpartum, and breastfeeding. Third, a limitation to the evidence for dietary outcomes was that the aspects of diet reported varied across studies. Although heterogeneity in reporting is expected, it can lead to questions of reporting bias. We did not identify eligible studies of WIC participation and food security, and this was unexpected given the central role of federal food assistance programs in addressing food security. A few studies published after 2009 were excluded because they lacked data since 2009. A paper by Kreider et al. 2016<sup>147</sup> analyzed National Health and Nutrition Examination Survey (NHANES) data from 1999 to 2008. They found that WIC participation was associated with a reduction in the prevalence of child food insecurity by at least 3.6 percentage points which was considered a 20 percent reduction. A study of WIC administrative data in Massachusetts from 2001 to 2006 found that longer duration of WIC participation was associated with reduced food insecurity of women during pregnancy and of children.<sup>148</sup> More research is needed on WIC participation and food security of women, children and families.

Included in the scope for the review were questions about differences in outcomes based on duration of participation in WIC and whether the association between WIC participation and outcomes varied by participant characteristics, including maternal age, race/ethnicity, geographic location, education, employment status, marital status, or housing. With the exception of a few studies focused on duration of WIC participation or that stratified results by maternal race or ethnicity, it is striking that we identified few studies on WIC participation and outcomes amongst these groups, about differential benefits associated with WIC participation, or how WIC may be addressing inequities in outcomes for specific vulnerable groups.

## **Applicability**

A number of factors could impact the applicability of our findings. The evidence base was broad in terms of geographic distribution (state representation), and the use of national surveillance data to address outcomes overall and by state. The findings should be generally applicable throughout the United States. However, for some outcomes, the evidence comes from multiple studies from a single data source. For example, multiple studies of WIC participation and childhood weight were conducted in Los Angeles County, California, often with the same

data source. Four of ten studies on household purchasing practices were from New England with some using the same data source. Because many outcomes result from behavioral decisions made within a socio-ecological setting, the generalizability of the evidence across the nation is reasonable but not certain.

As noted above, the evidence base was generally insufficient to address the sub-questions under Key Questions 1 and 2 regarding the effect of the duration of WIC participation or the differential effects among different subgroups. For some outcomes, results were stratified by race or ethnic groups, but often results were not reported for Asian American or Native American women, infants, and children.

## **Implications for Clinical Practice, Education, Research, or Health Policy**

The findings of this report should help to identify areas for future research and inform decision-making at both the clinical and policy levels. Although 82 quantitative studies were included in the review, the evidence was insufficient to draw definitive conclusions for many outcomes. For some outcomes, inconsistency of results and potential risk of bias led to conclusions with low SOE. For several key outcomes, we found moderate SOE, including birth outcomes, infant mortality, and child diet quality. For all outcomes in this review, new and/or more rigorous research with stronger analytic (causal inference) methods are needed. Priorities for research include maternal health outcomes during pregnancy and postpartum, food security, child anthropometric outcomes, and child development and academic achievement.

For pediatricians, obstetricians, dietitians and other clinicians who provide direct medical care to women, infants, and children, we summarized the most recent evidence on WIC services and how participation in the WIC program may contribute to improved obstetric and pediatric health outcomes. Increased duration of child participation in WIC may further establish healthy eating patterns and reduce the likelihood of child overweight and obesity. The evidence highlights a role for clinicians in asking women about WIC participation at the first and subsequent prenatal visits, and in asking families about WIC participation and recommending continued child participation in WIC to age 5 years. Qualitative research identified differences in nutrition advice between medical providers and WIC professionals during pregnancy and infancy, suggesting both a need and an opportunity for more coordination.

In contrast, the summarized evidence indicated negligible effects of WIC participation on indicators of breastfeeding initiation and insufficient evidence on breastfeeding duration or exclusivity. As noted earlier, the incorporation of services to support breastfeeding occurred prior to 2009, and the 2009 food package change incentivized breastfeeding through an expanded food package for fully breastfeeding women, and extended WIC benefits for partially breastfeeding women to one year postpartum. We identified some evidence that the 2009 food package change was associated with greater breastfeeding exclusivity, however, one qualitative study indicated that the enhanced food package for breastfeeding mothers would not affect decisions regarding breastfeeding.<sup>84</sup> Studies on the body mass index (BMI) status of child WIC participants at 2 to 4 years of age identified important differences in growth velocity in later infancy that vary by the type of infant food package assigned (based on caregiver decisions). Lowest risk was associated with receipt of the fully breastfeeding food package and with the duration of receipt, which means breastfeeding initiation and duration were each associated with lower risk of a child being overweight. Hence, a better understanding of food package choices and what they mean for mothers and infants is of high priority. Nevertheless, through this report,



clinicians can be informed about WIC support for breastfeeding, mixed and formula feeding choices, and improved nutrition from birth to age 5 years.

The evidence summarized here is relevant for nutritionists and practitioners working in WIC and the broader public health community. WIC staff should understand the evidence regarding WIC participation and maternal, infant, and child outcomes, and how the revised (current) food package may have affected outcomes. This is particularly important in the area of child diet and risk of overweight and obesity. Evidence from this review indicated that household WIC participation is associated with increased purchasing of whole grain foods and low-fat milks, with only slight use of non-WIC funds to maintain intakes of refined grains and whole milk. These findings are consistent with the dietary evidence that WIC participation is associated with improved diet quality through greater whole grain cereal and low-fat milk intakes. The lack of studies on dietary outcomes related to prenatal and postpartum WIC participation is surprising. The findings related to child WIC participation and fruit and vegetable consumption were less clear. Some of the qualitative studies identified caregiver uncertainties about whether specific vegetables qualified and gaps in grocery staff knowledge that created barriers to purchasing. These factors led to negative feelings about this component of the food package. Thus, rigorous studies on this important dietary component are needed to identify how WIC resources can improve fruit and vegetable purchasing and consumption.

As detailed in the review, and considering both maternal and child diet quality, WIC participation was associated with 2- to 4- point higher total HEI score that correspond to effect sizes on the order of 0.2 to 0.4 SD. One study<sup>113</sup> reported that a household-level HEI was about two points higher overall but was nine points higher during weeks when WIC funds were used, reminding us that WIC benefits result in the periodic provision of supplemental nutritious foods to participants. Thus, reported differences in diet quality across studies may be related to methodological decisions about data collection relative to benefit issuance and redemption, rather than differences attributable to WIC participation or services per se. In the future, findings related to diet quality should be standardized to address this source of bias.

This review identifies important areas where more research is needed on WIC participation and outcomes for women, infants, and children. Some areas such as research on breastfeeding and dietary outcomes have already been mentioned, and here we highlight other important areas. First, investigators need a comprehensive research agenda on maternal WIC participation and maternal mortality, morbidity (including anemia, preeclampsia, gestational diabetes, and hypertension), and well-being during pregnancy and postpartum. This research should evaluate how WIC participation is associated with outcomes and unpack whether these associations vary by participant characteristics. The evidence regarding reduced low birth weight and preterm delivery associated with WIC participation suggests the potential for identifying WIC-associated improvements in maternal diet and health during pregnancy. This would further refine the pathways through which WIC participation is associated with these outcomes. Second, more evidence is needed regarding infant and child health outcomes associated with maternal and/or WIC participation, including preventive and treatment visits, and immunization coverage. These are important areas for child health outcomes and yet, between the prior review and the current report, the evidence base has expanded only modestly. Third, we need more research on WIC participation and child growth outcomes leading to status measures including high weight status, overweight, and obesity. This would require new longitudinal studies of WIC participants compared with WIC-eligible non-participants. Fourth, we need new comprehensive longitudinal studies on child development outcomes including academic performance because limited data

sources are currently available on these outcomes. Fifth, we need studies on WIC participation and food security to understand how WIC participation is associated with food security and whether it varies by duration of participation or by participant characteristics. More research also is needed to understand WIC participation and retention decision making to inform and address selection bias within all WIC-related research. Finally, we call for the use of research designs that better address selection bias and confounding to enhance the rigor of future evidence on maternal, infant, and child outcomes associated with WIC participation. Use of such designs would help to address questions about outcomes in sub-groups of the population.

Evidence from this review could help policy makers at the state and federal levels to determine whether changes should be made in the WIC program and/or policy to further improve dietary and health outcomes for women and children. The results of this review should be reassuring that, despite weaknesses in study design and analytic methodologies, current evidence suggests improvement in maternal, infant, and child outcomes associated with WIC participation and with the 2009 food package change. Recommendations from a 2006 IOM report led to those 2009 revisions.<sup>7</sup> A second report in 2017 recommended further revisions to the food packages to further align with the 2015–2020 DGA and to support breastfeeding.<sup>149, 150</sup> However, the 2017 recommendations have not yet been enacted. Concurrently, work began to expand the DGA for pregnancy and birth to 24 months, and in late 2020 the 2020-2025 DGA was released.<sup>10</sup> The results of this review may provide an evidence base for considering the impact of prior recommendations when implementing new guidelines within WIC to further support diet and health outcomes for women, infants, and children.

## Conclusions

The WIC program was established to safeguard the health of low-income women, infants, and children less than five years old who are at nutritional risk, by providing nutritious supplemental foods, nutrition education, breastfeeding support, and referrals to other health and social service programs. This systematic review assessed the recent landscape of WIC research to synthesize findings related to health and dietary outcomes for WIC participants. Findings related to improvements in birth outcomes, infant mortality, and diet quality among children all support WIC's standing as an important part of the public health infrastructure. This review also highlights research gaps that point to a need for further investigation, using high quality methods, to better understand the relationship between WIC participation and outcomes. Research gaps pertaining to differential effects in key subgroups (such as race/ethnicity) also highlight the need for further research across these subgroups for all outcomes.

## References

1. WIC Data Tables. US Department of Agriculture; 2021. <https://www.fns.usda.gov/pd/wic-program>. Accessed on August 17, 2021.
2. WIC Nutrition Risk Criteria. US Department of Agriculture; 2011. <https://www.fns.usda.gov/wic/nutrition-risk-criteria>. Accessed on September 17, 2021.
3. National- and State-Level Estimates of WIC Eligibility and WIC Program Reach in 2018 With Updated Estimates for 2016 and 2017. US Department of Agriculture; 2021. <https://www.fns.usda.gov/wic/national-and-state-level-estimates-wic-eligibility-and-wic-program-reach-2018-updated>. Accessed on August 17, 2021.
4. Fox MK, Hamilton W, Lin BH. Effects of Food Assistance and Nutrition Programs on Nutrition and Health: Volume 3, Literature Review. U.S. Department of Agriculture. Washington, DC: 2004. <https://www.ers.usda.gov/publications/pub-details/?pubid=46574>
5. Colman S, Nichols-Barrer IP, REdline JE, et al. Effects of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): A Review of Recent Research U.S. Department of Agriculture. Alexandria, VA: 2012. <https://fns-prod.azureedge.net/sites/default/files/WICMedicaidLitRev.pdf>
6. USDA/FNS 7 CFR Part 246 [FNS–2006–0037] RIN 0584–AD77 Special Supplemental Nutrition Program for Women, Infants and Children (WIC): Revisions in the WIC Food Packages. Federal Register / Vol. 72, No. 234 U.S. Department of Agriculture. Alexandria, VA: 2007. <http://www.gpo.gov/fdsys/pkg/FR-2007-12-06/pdf/E7-23033.pdf>
7. Institute of Medicine. WIC Food Packages: Time for a Change The National Academies Press. Washington, DC: 2006.
8. Breastfeeding and the use of human milk. Pediatrics. 2012 Mar;129(3):e827-41. doi: 10.1542/peds.2011-3552. PMID: 22371471.
9. U.S. Department of Health and Human Services, U.S. Department of Agriculture. Dietary Guidelines for Americans, 2005. 6 ed. Washington, DC: U.S. Government Printing Office; 2005.
10. Dietary Guidelines for Americans, 2020–2025. 9th Edition U.S. Department of Agriculture and U.S. Department of Health and Human Services. 2020. DietaryGuidelines.gov
11. PUBLIC LAW 111–296. 2010. [https://fns-prod.azureedge.net/sites/default/files/PL\\_111-296.pdf](https://fns-prod.azureedge.net/sites/default/files/PL_111-296.pdf). Accessed on March 12, 2021.
12. PRISMA Statement. PRISMA; 2021. <http://www.prisma-statement.org/PRISMAStatement/PRISMAStatement.aspx>. Accessed on November 23, 2021.
13. Currie J, Rossin-Slater M. Does the WIC program promote equality of opportunity in early life? In: Tach L, Dunifon R, Miller DL, eds. Confronting inequality: How policies and practices shape children's opportunities. Washington, DC: American Psychological Association; 2020:49-66.
14. Whaley SE, Martinez CE, Paolicelli C, et al. Predictors of WIC Participation Through 2 Years of Age. J Nutr Educ Behav. 2020 Jul;52(7):672-9. doi: 10.1016/j.jneb.2019.12.015. PMID: 32067886.
15. Whaley SE, Whaley M, Au LE, et al. Breastfeeding Is Associated With Higher Retention in WIC After Age 1. J Nutr Educ Behav. 2017 Nov-Dec;49(10):810-6.e1. doi: 10.1016/j.jneb.2017.07.003. PMID: 28890264.
16. Jacknowitz A, Tichen L. Transitions into and out of the WIC Program: A cause for concern? Social Service Review. 2009;83(2):151-83. doi: 10.1086/600111.

17. Supplemental Evidence and Data Request on Maternal and Childhood Outcomes Associated With the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). National Archives; 2020. <https://www.federalregister.gov/documents/2020/12/16/2020-27645/supplemental-evidence-and-data-request-on-maternal-and-childhood-outcomes-associated-with-the>. Accessed on August 20, 2021.
18. Quality Assessment Tool for Quantitative Studies. Effective Public Healthcare Panacea Project; 2021. <https://www.epphp.ca/quality-assessment-tool-for-quantitative-studies/>. Accessed on November 23, 2021.
19. JBI Manual For Evidence Synthesis. JBI; 2020. <https://wiki.jbi.global/display/MANUAL/2.1+Introduction+and+purpose+of+this+guidance>. Accessed on March 12, 2021.
20. Methods Guide for Effectiveness and Comparative Effectiveness Reviews. AHRQ Publication No. 10(14)-EHC063-EF Agency for Healthcare Research and Quality. Rockville, MD: 2014. [www.effectivehealthcare.ahrq.gov](http://www.effectivehealthcare.ahrq.gov)
21. Gleason S, Pooler J. The Effects of Changes in WIC Food Packages on Redemptions. Contractor and Cooperator Report No. 69 Altarum Institute. 2011. <https://naldc.nal.usda.gov/download/50613/PDF>
22. Borger C, Zimmerman T, Vericker T, et al. WIC Infant and Toddler Feeding Practices Study-2: Fourth Year Report Food and Nutrition Service, U.S. Department of Agriculture. Alexandria, VA: 2020. <https://www.fns.usda.gov/wic/infant-and-toddler-feeding-practices-study-2-fourth-year-report>
23. Weinfield NS, Borger C, Zimmerman T, et al. WIC Infant and Toddler Feeding Practices Study-2: Third Year Report Food and Nutrition Service, U.S. Department of Agriculture. Alexandria, VA: 2019. <https://www.fns.usda.gov/wic/wic-infant-and-toddler-feeding-practices-study-2-third-year-report>
24. Sonchak L. The impact of WIC on breastfeeding initiation and gestational weight gain: Case study of South Carolina Medicaid mothers. Children and Youth Services Review. 2017;79:115-25. doi: 10.1016/j.chilcyouth.2017.05.024.
25. Kasim MT, Ukert B. The impact of WIC participation on tobacco use and alcohol consumption. Contemporary Economic Policy. 2021;39(3):608-25. doi: 10.1111/coep.12525.
26. Hamad R, Collin DF, Baer RJ, et al. Association of Revised WIC Food Package With Perinatal and Birth Outcomes: A Quasi-Experimental Study. JAMA Pediatr. 2019 Jul 1;173(9):845-52. doi: 10.1001/jamapediatrics.2019.1706. PMID: 31260072.
27. Institute of Medicine. Weight gain during pregnancy: reexamining the guidelines National Academies Press. Washington DC: 2009.
28. Finger KR, Lob SH, Dove MS, et al. Reassessing the Association between WIC and Birth Outcomes Using a Fetuses-at-Risk Approach. Matern Child Health J. 2017 Apr;21(4):825-35. doi: 10.1007/s10995-016-2176-9. PMID: 27531011.
29. Sonchak L. The Impact of WIC on Birth Outcomes: New Evidence from South Carolina. Matern Child Health J. 2016 Jul;20(7):1518-25. doi: 10.1007/s10995-016-1951-y. PMID: 26976280.
30. Soneji S, Beltrán-Sánchez H. Association of Special Supplemental Nutrition Program for Women, Infants, and Children With Preterm Birth and Infant Mortality. JAMA Netw Open. 2019 Dec 2;2(12):e1916722. doi: 10.1001/jamanetworkopen.2019.16722. PMID: 31800070.
31. Rhee J, Fabian MP, Ettinger de Cuba S, et al. Effects of Maternal Homelessness, Supplemental Nutrition Programs, and Prenatal PM(2.5) on Birthweight. Int J Environ Res Public Health. 2019 Oct 28;16(21)doi: 10.3390/ijerph16214154. PMID: 31661898.

32. Hamad R, Batra A, Karasek D, et al. The Impact of the Revised WIC Food Package on Maternal Nutrition During Pregnancy and Postpartum. *Am J Epidemiol*. 2019 Aug 1;188(8):1493-502. doi: 10.1093/aje/kwz098. PMID: 31094428.
33. Guenther PM, Kirkpatrick SI, Reedy J, et al. The Healthy Eating Index-2010 is a valid and reliable measure of diet quality according to the 2010 Dietary Guidelines for Americans. *J Nutr*. 2014 Mar;144(3):399-407. doi: 10.3945/jn.113.183079. PMID: 24453128.
34. Guenther PM, Reedy J, Krebs-Smith SM. Development of the Healthy Eating Index-2005. *J Am Diet Assoc*. 2008 Nov;108(11):1896-901. doi: 10.1016/j.jada.2008.08.016. PMID: 18954580.
35. Xu Z, Steffen LM, Selvin E, et al. Diet quality, change in diet quality and risk of incident CVD and diabetes. *Public Health Nutr*. 2020 Feb;23(2):329-38. doi: 10.1017/s136898001900212x. PMID: 31511110.
36. Kirkpatrick SI, Reedy J, Krebs-Smith SM, et al. Applications of the Healthy Eating Index for Surveillance, Epidemiology, and Intervention Research: Considerations and Caveats. *J Acad Nutr Diet*. 2018 Sep;118(9):1603-21. doi: 10.1016/j.jand.2018.05.020. PMID: 30146072.
37. Chia AR, Chen LW, Lai JS, et al. Maternal Dietary Patterns and Birth Outcomes: A Systematic Review and Meta-Analysis. *Adv Nutr*. 2019 Jul 1;10(4):685-95. doi: 10.1093/advances/nmy123. PMID: 31041446.
38. Oberle MM, Freese R, Shults J, et al. Impact of the 2009 WIC Food Package Changes on Maternal Dietary Quality. *Journal of Hunger and Environmental Nutrition*. 2020doi: 10.1080/19320248.2020.1724227.
39. Anderson CK, Walch TJ, Lindberg SM, et al. Excess Gestational Weight Gain in Low-Income Overweight and Obese Women: A Qualitative Study. *J Nutr Educ Behav*. 2015 Sep-Oct;47(5):404-11.e1. doi: 10.1016/j.jneb.2015.05.011. PMID: 26187348.
40. Kim LP, Koleilat M, Whaley SE. A Qualitative Study to Examine Perceptions and Barriers to Appropriate Gestational Weight Gain among Participants in the Special Supplemental Nutrition Program for Women Infants and Children Program. *J Pregnancy*. 2016;2016:4569742. doi: 10.1155/2016/4569742. PMID: 27403341.
41. Hromi-Fiedler A, Chapman D, Segura-Pérez S, et al. Barriers and Facilitators to Improve Fruit and Vegetable Intake Among WIC-Eligible Pregnant Latinas: An Application of the Health Action Process Approach Framework. *J Nutr Educ Behav*. 2016 Jul-Aug;48(7):468-77.e1. doi: 10.1016/j.jneb.2016.04.398. PMID: 27373861.
42. Baer RJ, Altman MR, Oltman SP, et al. Maternal factors influencing late entry into prenatal care: a stratified analysis by race or ethnicity and insurance status. *J Matern Fetal Neonatal Med*. 2019 Oct;32(20):3336-42. doi: 10.1080/14767058.2018.1463366. PMID: 29631462.
43. Anglely M, Thorsten VR, Drews-Botsch C, et al. Association of participation in a supplemental nutrition program with stillbirth by race, ethnicity, and maternal characteristics. *BMC Pregnancy Childbirth*. 2018 Jul 24;18(1):306. doi: 10.1186/s12884-018-1920-0. PMID: 30041624.
44. El-Bastawissi AY, Peters R, Sasseen K, et al. Effect of the Washington Special Supplemental Nutrition Program for Women, Infants and Children (WIC) on pregnancy outcomes. *Matern Child Health J*. 2007 Nov;11(6):611-21. doi: 10.1007/s10995-007-0212-5. PMID: 17562153.
45. Testa A, Jackson DB. Incarceration Exposure During Pregnancy and Infant Health: Moderation by Public Assistance. *J Pediatr*. 2020 Jun 23doi: 10.1016/j.jpeds.2020.06.055. PMID: 32590000.
46. Oropesa RS, Landale NS, Dávila AL. Poverty, prenatal care, and infant health in Puerto Rico. *Soc Biol*. 2001 Spring-Summer;48(1-2):44-66. doi: 10.1080/19485565.2001.9989027. PMID: 12194447.

47. Black MM, Quigg AM, Cook J, et al. WIC participation and attenuation of stress-related child health risks of household food insecurity and caregiver depressive symptoms. *Arch Pediatr Adolesc Med.* 2012 May;166(5):444-51. doi: 10.1001/archpediatrics.2012.1. PMID: 22566545.
48. Bersak T, Sonchak L. The Impact of WIC on Infant Immunizations and Health Care Utilization. *Health Serv Res.* 2018 Aug;53 Suppl 1(Suppl Suppl 1):2952-69. doi: 10.1111/1475-6773.12810. PMID: 29194615.
49. Casillas SM, Bednarczyk RA. Missed Opportunities for Hepatitis A Vaccination, National Immunization Survey-Child, 2013. *J Pediatr.* 2017 Aug;187:265-71.e1. doi: 10.1016/j.jpeds.2017.04.001. PMID: 28483064.
50. Thomas TN, Kolasa MS, Zhang F, et al. Assessing immunization interventions in the Women, Infants, and Children (WIC) program. *Am J Prev Med.* 2014 Nov;47(5):624-8. doi: 10.1016/j.amepre.2014.06.017. PMID: 25217817.
51. Smock L, Martelon M, Metallinos-Katsaras E, et al. Recovery From Malnutrition Among Refugee Children Following Participation in the Special Supplemental Nutrition for Women, Infants, and Children (WIC) Program in Massachusetts, 1998-2010. *J Public Health Manag Pract.* 2020 Jan/Feb;26(1):71-9. doi: 10.1097/phh.0000000000000995. PMID: 30969273.
52. Pan L, Freedman DS, Park S, et al. Changes in Obesity Among US Children Aged 2 Through 4 Years Enrolled in WIC During 2010-2016. *Jama.* 2019 Jun 18;321(23):2364-6. doi: 10.1001/jama.2019.5051. PMID: 31211336.
53. Pan L, Freedman DS, Sharma AJ, et al. Trends in Obesity Among Participants Aged 2-4 Years in the Special Supplemental Nutrition Program for Women, Infants, and Children - United States, 2000-2014. *MMWR Morb Mortal Wkly Rep.* 2016 Nov 18;65(45):1256-60. doi: 10.15585/mmwr.mm6545a2. PMID: 27855143.
54. Chaparro MP, Anderson CE, Crespi CM, et al. The new child food package is associated with reduced obesity risk among formula fed infants participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in Los Angeles County, California, 2003-2016. *Int J Behav Nutr Phys Act.* 2020 Feb 10;17(1):18. doi: 10.1186/s12966-020-0921-3. PMID: 32041634.
55. Chaparro MP, Wang MC, Anderson CE, et al. The Association between the 2009 WIC Food Package Change and Early Childhood Obesity Risk Varies by Type of Infant Package Received. *J Acad Nutr Diet.* 2020 Mar;120(3):371-85. doi: 10.1016/j.jand.2019.09.014. PMID: 31831385.
56. Chaparro MP, Crespi CM, Anderson CE, et al. The 2009 Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food package change and children's growth trajectories and obesity in Los Angeles County. *Am J Clin Nutr.* 2019 May 1;109(5):1414-21. doi: 10.1093/ajcn/nqy347. PMID: 31011750.
57. Anderson CE, Whaley SE, Crespi CM, et al. Every month matters: longitudinal associations between exclusive breastfeeding duration, child growth and obesity among WIC-participating children. *J Epidemiol Community Health.* 2020 Jul 1doi: 10.1136/jech-2019-213574. PMID: 32611693.
58. Chiasson MA, Scheinmann R, Hartel D, et al. Predictors of Obesity in a Cohort of Children Enrolled in WIC as Infants and Retained to 3 Years of Age. *J Community Health.* 2016 Feb;41(1):127-33. doi: 10.1007/s10900-015-0077-2. PMID: 26280211.
59. Anderson CE, Crespi CM, Wang MC, et al. The neighborhood food environment modifies the effect of the 2009 WIC food package change on childhood obesity in Los Angeles County, California. *BMC Public Health.* 2020 May 13;20(1):678. doi: 10.1186/s12889-020-08779-2. PMID: 32404069.

60. Daepf MIG, Gortmaker SL, Wang YC, et al. WIC Food Package Changes: Trends in Childhood Obesity Prevalence. *Pediatrics*. 2019 May;143(5)doi: 10.1542/peds.2018-2841. PMID: 30936251.
61. Chaparro MP, Anderson CE, Crespi CM, et al. The effect of the 2009 WIC food package change on childhood obesity varies by gender and initial weight status in Los Angeles County. *Pediatr Obes*. 2019 Sep;14(9):e12526. doi: 10.1111/ijpo.12526. PMID: 30942561.
62. Guan A, Hamad R, Batra A, et al. The Revised WIC Food Package and Child Development: A Quasi-Experimental Study. *Pediatrics*. 2021 Feb;147(2)doi: 10.1542/peds.2020-1853. PMID: 33495370.
63. Lakshmanan A, Song AY, Flores-Fenlon N, et al. Association of WIC Participation and Growth and Developmental Outcomes in High-Risk Infants. *Clin Pediatr (Phila)*. 2020 Jan;59(1):53-61. doi: 10.1177/0009922819884583. PMID: 31672064.
64. Chaparro MP, Whaley SE, Anderson CE, et al. The role of income and neighbourhood poverty in the association between the 2009 Special Supplemental Nutrition Program for Women, Infants and Children (WIC) food package change and child obesity among WIC-participating children in Los Angeles County, 2003-2016. *Public Health Nutr*. 2020 Dec 22;1-8. doi: 10.1017/s1368980020005200. PMID: 33349277.
65. Pan L, Blanck HM, Galuska DA, et al. Changes in High Weight-for-Length among Infants Enrolled in Special Supplemental Nutrition Program for Women, Infants, and Children during 2010–2018. *Childhood Obesity*. 2021;17(6):408-19. doi: 10.1089/chi.2021.0055. PMID: 152009661. Language: English. Entry Date: 20210830. Revision Date: 20210830. Publication Type: Article.
66. Freedman DS, Sharma AJ, Hamner HC, et al. Trends in Weight-for-Length Among Infants in WIC From 2000 to 2014. *Pediatrics*. 2017 Jan;139(1)doi: 10.1542/peds.2016-2034. PMID: 27965380.
67. Joyce T, Reeder J. Changes in breastfeeding among WIC participants following implementation of the new food package. *Matern Child Health J*. 2015 Apr;19(4):868-76. doi: 10.1007/s10995-014-1588-7. PMID: 25095768.
68. Zhang Q, Chen C, Xue H, et al. Revisiting the Relationship between WIC Participation and Breastfeeding among Low-Income Children in the U.S. after the 2009 WIC Food Package Revision. *Food Policy*. 2021 May;101doi: 10.1016/j.foodpol.2021.102089. PMID: 34054198.
69. Li K, Wen M, Reynolds M, et al. WIC Participation and Breastfeeding after the 2009 WIC Revision: A Propensity Score Approach. *Int J Environ Res Public Health*. 2019 Jul 24;16(15)doi: 10.3390/ijerph16152645. PMID: 31344937.
70. Bersak T, Sonchak-Ardan L. Marginal changes, marginal impacts: The limits of changes to WIC and their ability to influence breastfeeding rates. *Children & Youth Services Review*. 2021;126:N.PAG-N.PAG. doi: 10.1016/j.childyouth.2021.106043. PMID: 150850754. Language: English. Entry Date: 20210623. Revision Date: 20210623. Publication Type: Article.
71. Ma X, Liu J, Smith M. WIC participation and breastfeeding in South Carolina: updates from PRAMS 2009-2010. *Matern Child Health J*. 2014 Jul;18(5):1271-9. doi: 10.1007/s10995-013-1362-2. PMID: 24057992.
72. Barrera CM, Hamner HC, Perrine CG, et al. Timing of Introduction of Complementary Foods to US Infants, National Health and Nutrition Examination Survey 2009-2014. *J Acad Nutr Diet*. 2018 Mar;118(3):464-70. doi: 10.1016/j.jand.2017.10.020. PMID: 29307590.
73. Wilde P, Wolf A, Fernandes M, et al. Food-package assignments and breastfeeding initiation before and after a change in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Am J Clin Nutr*. 2012 Sep;96(3):560-6. doi: 10.3945/ajcn.112.037622. PMID: 22836028.

74. Lee F, Edmunds LS, Cong X, et al. Trends in Breastfeeding Among Infants Enrolled in the Special Supplemental Nutrition Program for Women, Infants and Children - New York, 2002-2015. *MMWR Morb Mortal Wkly Rep*. 2017 Jun 16;66(23):610-4. doi: 10.15585/mmwr.mm6623a4. PMID: 28617769.
75. Langellier BA, Chaparro MP, Wang MC, et al. The new food package and breastfeeding outcomes among women, infants, and children participants in Los Angeles County. *Am J Public Health*. 2014 Feb;104 Suppl 1(Suppl 1):S112-8. doi: 10.2105/ajph.2013.301330. PMID: 24354843.
76. Whaley SE, Koleilat M, Whaley M, et al. Impact of policy changes on infant feeding decisions among low-income women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Am J Public Health*. 2012 Dec;102(12):2269-73. doi: 10.2105/ajph.2012.300770. PMID: 23078467.
77. McCoy MB, Geppert J, Dech L, et al. Associations Between Peer Counseling and Breastfeeding Initiation and Duration: An Analysis of Minnesota Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). *Matern Child Health J*. 2018 Jan;22(1):71-81. doi: 10.1007/s10995-017-2356-2. PMID: 28755046.
78. Gleason S, Wilkin MK, Sallack L, et al. Breastfeeding Duration Is Associated With WIC Site-Level Breastfeeding Support Practices. *J Nutr Educ Behav*. 2020 Jul;52(7):680-7. doi: 10.1016/j.jneb.2020.01.014. PMID: 32171671.
79. Almeida R, Alvarez Gutierrez S, Whaley SE, et al. A Qualitative Study of Breastfeeding and Formula-Feeding Mothers' Perceptions of and Experiences in WIC. *J Nutr Educ Behav*. 2020 Jun;52(6):615-25. doi: 10.1016/j.jneb.2019.12.006. PMID: 31955996.
80. Schindler-Ruwisch J, Roess A, Robert RC, et al. Determinants of Breastfeeding Initiation and Duration Among African American DC WIC Recipients: Perspectives of Recent Mothers. *Womens Health Issues*. 2019 Nov-Dec;29(6):513-21. doi: 10.1016/j.whi.2019.07.003. PMID: 31409521.
81. Scott A, Shreve M, Ayers B, et al. Breastfeeding perceptions, beliefs and experiences of Marshallese migrants: an exploratory study. *Public Health Nutr*. 2016 Nov;19(16):3007-16. doi: 10.1017/s1368980016001221. PMID: 27230629.
82. Gross TT, Powell R, Anderson AK, et al. WIC peer counselors' perceptions of breastfeeding in African American women with lower incomes. *J Hum Lact*. 2015 Feb;31(1):99-110. doi: 10.1177/0890334414561061. PMID: 25480019.
83. Hohl S, Thompson B, Escareño M, et al. Cultural Norms in Conflict: Breastfeeding Among Hispanic Immigrants in Rural Washington State. *Maternal & Child Health Journal*. 2016;20(7):1549-57. doi: 10.1007/s10995-016-1954-8. PMID: 116170891. Language: English. Entry Date: 20160622. Revision Date: 20170703. Publication Type: Article.
84. Bedwell RM. The Impact of Federal Breastfeeding Policy Initiatives on Women's Breastfeeding Practices and Attitudes in Southern Indiana. *Journal of Poverty*. 2017;21(6):508-27. doi: 10.1080/10875549.2017.1348423.
85. Gross TT, Davis M, Anderson AK, et al. Long-Term Breastfeeding in African American Mothers. *J Hum Lact*. 2017 Feb;33(1):128-39. doi: 10.1177/0890334416680180. PMID: 28061039.
86. Isaacs S, Shriver L, Haldeman L. Qualitative analysis of maternal barriers and perceptions to participation in a federal supplemental nutrition program in rural appalachian North Carolina. *J Appalachian Health*. 2020;2(4):37-52. doi: doi.org/10.13023/jah.0204.06.



87. Ruiz M, Arroyo H, Dávila Torres R, et al. Qualitative Study on WIC Program Strategies to Promote Breastfeeding Practices in Puerto Rico: What do Nutritionist/Dietician's [sic] Think? *Maternal & Child Health Journal*. 2011;15(4):520-6. doi: 10.1007/s10995-010-0592-9.
88. Tester JM, Leung CW, Crawford PB. Revised WIC Food Package and Children's Diet Quality. *Pediatrics*. 2016 May;137(5)doi: 10.1542/peds.2015-3557. PMID: 27244804.
89. Guthrie JF, Catellier DJ, Jacquier EF, et al. WIC and non-WIC Infants and Children Differ in Usage of Some WIC-Provided Foods. *J Nutr*. 2018 Sep 1;148(suppl\_3):1547s-56s. doi: 10.1093/jn/nxy157. PMID: 30247584.
90. Jun S, Catellier DJ, Eldridge AL, et al. Usual Nutrient Intakes from the Diets of US Children by WIC Participation and Income: Findings from the Feeding Infants and Toddlers Study (FITS) 2016. *J Nutr*. 2018 Sep 1;148(9s):1567s-74s. doi: 10.1093/jn/nxy059. PMID: 29878136.
91. Gu X, Tucker KL. Dietary quality of the US child and adolescent population: trends from 1999 to 2012 and associations with the use of federal nutrition assistance programs. *Am J Clin Nutr*. 2017 Jan;105(1):194-202. doi: 10.3945/ajcn.116.135095. PMID: 27881390.
92. Vercammen KA, Moran AJ, Zatz LY, et al. 100% Juice, Fruit, and Vegetable Intake Among Children in the Special Supplemental Nutrition Program for Women, Infants, and Children and Nonparticipants. *Am J Prev Med*. 2018 Jul;55(1):e11-e8. doi: 10.1016/j.amepre.2018.04.003. PMID: 29776784.
93. Hamner HC, Paolicelli C, Casavale KO, et al. Food and Beverage Intake From 12 to 23 Months by WIC Status. *Pediatrics*. 2019 Mar;143(3)doi: 10.1542/peds.2018-2274. PMID: 30733238.
94. Kay MC, Duffy EW, Harnack LJ, et al. Kay MC, Duffy EW, Harnack LJ, Anater AS, Hampton JC, Eldridge AL, Story M. Development and Application of a Total Diet Quality Index for Toddlers. *Nutrients*. 2021;13(6):1943. doi: 10.3390/nu13061943.
95. Zimmer MC, Vernarelli JA. Select Food Group Intake of US Children Aged 2 to 4 Years by WIC Participation Status and Income. *J Acad Nutr Diet*. 2020 Dec;120(12):2032-8.e1. doi: 10.1016/j.jand.2020.07.027. PMID: 33222884.
96. Kong A, Odoms-Young AM, Schiffer LA, et al. The 18-month impact of special supplemental nutrition program for women, infants, and children food package revisions on diets of recipient families. *Am J Prev Med*. 2014 Jun;46(6):543-51. doi: 10.1016/j.amepre.2014.01.021. PMID: 24842730.
97. Zimmer MC, Vernarelli JA. Changes in nutrient and food group intakes among children and women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children: findings from the 2005-2008 and 2011-2014 National Health and Nutrition Examination Surveys. *Public Health Nutr*. 2019 Dec;22(18):3309-14. doi: 10.1017/s1368980019002702. PMID: 31566166.
98. Odoms-Young AM, Kong A, Schiffer LA, et al. Evaluating the initial impact of the revised Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food packages on dietary intake and home food availability in African-American and Hispanic families. *Public Health Nutr*. 2014 Jan;17(1):83-93. doi: 10.1017/s1368980013000761. PMID: 23544992.
99. Whaley SE, Ritchie LD, Spector P, et al. Revised WIC food package improves diets of WIC families. *J Nutr Educ Behav*. 2012 May-Jun;44(3):204-9. doi: 10.1016/j.jneb.2011.09.011. PMID: 22406013.
100. Guthrie JF, Anater AS, Hampton JC, et al. The Special Supplemental Nutrition Program for Women, Infants, and Children is Associated with Several Changes in Nutrient Intakes and Food Consumption Patterns of Participating Infants and Young Children, 2008 Compared with 2016. *J Nutr*. 2020 Nov 19;150(11):2985-93. doi: 10.1093/jn/nxaa265. PMID: 33024989.

101. Ishdorj A, Capps Jr O. The effect of revised WIC food packages on native American children. *American Journal of Agricultural Economics*. 2013;95(5):1266-72. doi: 10.1093/ajae/aat030.
102. Meiqari L, Torre L, Gazmararian JA. Exploring the Impact of the New WIC Food Package on Low-Fat Milk Consumption Among WIC Recipients: A Pilot Study. *J Health Care Poor Underserved*. 2015 Aug;26(3):712-25. doi: 10.1353/hpu.2015.0092. PMID: 26320907.
103. Morshed AB, Davis SM, Greig EA, et al. Effect of WIC Food Package Changes on Dietary Intake of Preschool Children in New Mexico. *Health Behav Policy Rev*. 2015 Jan;2(1):3-12. doi: 10.14485/hbpr.2.1.1. PMID: 27668264.
104. Weinfield NS, Borger C, Gola AA. Breastfeeding Duration in a Low-Income Sample Is Associated With Child Diet Quality at Age Three. *J Hum Lact*. 2020 Feb 24;890334420903029. doi: 10.1177/0890334420903029. PMID: 32091965.
105. Weinfield NS, Borger C, Au LE, et al. Longer Participation in WIC Is Associated with Better Diet Quality in 24-Month-Old Children. *J Acad Nutr Diet*. 2020 Jun;120(6):963-71. doi: 10.1016/j.jand.2019.12.012. PMID: 32067936.
106. O'Connor EA, Evans CV, Burda BU, et al. Screening for Obesity and Intervention for Weight Management in Children and Adolescents: Evidence Report and Systematic Review for the US Preventive Services Task Force. *Jama*. 2017 Jun 20;317(23):2427-44. doi: 10.1001/jama.2017.0332. PMID: 28632873.
107. Thornton HE, Crixell SH, Reat AM, et al. Differences in energy and micronutrient intakes among Central Texas WIC infants and toddlers after the package change. *J Nutr Educ Behav*. 2014 May-Jun;46(3 Suppl):S79-86. doi: 10.1016/j.jneb.2014.02.005. PMID: 24810001.
108. Perkins S, Daley A, Yerxa K, et al. The Effectiveness of the Expanded Food and Nutrition Education Program (EFNEP) on Diet Quality as Measured by the Healthy Eating Index. *Am J Lifestyle Med*. 2020 May-Jun;14(3):316-25. doi: 10.1177/1559827619872733. PMID: 32477034.
109. Oh M, Jensen HH, Rahkovsky I. Did revisions to the wic program affect household expenditures on whole grains? *Applied Economic Perspectives and Policy*. 2016;38(4):578-98. doi: 10.1093/aep/pepw020.
110. Ng SW, Hollingsworth BA, Busey EA, et al. Federal Nutrition Program Revisions Impact Low-income Households' Food Purchases. *Am J Prev Med*. 2018 Mar;54(3):403-12. doi: 10.1016/j.amepre.2017.12.003. PMID: 29455757.
111. Stewart H, McLaughlin PW, Dong D, et al. WIC Households' Bread and Cold Cereal Purchases: When They Use Benefits Versus Paying Out of Pocket. *Am J Health Promot*. 2019 Jan;33(1):79-86. doi: 10.1177/0890117118778243. PMID: 29847997.
112. Litvak J, Parekh N, Juul F, et al. Food assistance programs and income are associated with the diet quality of grocery purchases for households consisting of women of reproductive age or young children. *Prev Med*. 2020 Sep;138:106149. doi: 10.1016/j.ypmed.2020.106149. PMID: 32473261.
113. Fang D, Thomsen MR, Nayga RM, Jr., et al. WIC Participation and Relative Quality of Household Food Purchases: Evidence from FoodAPS. *Southern Economic Journal*. 2019;86(1):83-105. doi: 10.1002/soej.12363.
114. Andreyeva T, Luedicke J, Henderson KE, et al. The positive effects of the revised milk and cheese allowances in the special supplemental nutrition program for women, infants, and children. *J Acad Nutr Diet*. 2014 Apr;114(4):622-30. doi: 10.1016/j.jand.2013.08.018. PMID: 24210878.

115. Andreyeva T, Luedicke J, Tripp AS, et al. Effects of reduced juice allowances in food packages for the women, infants, and children program. *Pediatrics*. 2013 May;131(5):919-27. doi: 10.1542/peds.2012-3471. PMID: 23629613.
116. Andreyeva T, Luedicke J. Incentivizing fruit and vegetable purchases among participants in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Public Health Nutr*. 2015 Jan;18(1):33-41. doi: 10.1017/s1368980014000512. PMID: 24809502.
117. Andreyeva T, Luedicke J. Federal food package revisions: effects on purchases of whole-grain products. *Am J Prev Med*. 2013 Oct;45(4):422-9. doi: 10.1016/j.amepre.2013.05.009. PMID: 24050418.
118. Andreyeva T, Tripp AS. The healthfulness of food and beverage purchases after the federal food package revisions: The case of two New England states. *Prev Med*. 2016 Oct;91:204-10. doi: 10.1016/j.ypmed.2016.08.018. PMID: 27527573.
119. Robson SM, DeLuccia R, Baker S, et al. Qualitative Research on the Real-Time Decision Making of WIC Participants While Food Shopping: Use of Think-Aloud Methodology. *J Acad Nutr Diet*. 2020 Jan;120(1):111-9. doi: 10.1016/j.jand.2019.05.009. PMID: 31307943.
120. Bertmann FM, Barroso C, Ohri-Vachaspati P, et al. Women, infants, and children cash value voucher (CVV) use in Arizona: a qualitative exploration of barriers and strategies related to fruit and vegetable purchases. *J Nutr Educ Behav*. 2014 May-Jun;46(3 Suppl):S53-8. doi: 10.1016/j.jneb.2014.02.003. PMID: 24809997.
121. Weber SJ, Wichelecki J, Chavez N, et al. Understanding the factors influencing low-income caregivers' perceived value of a federal nutrition programme, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). *Public Health Nutr*. 2019 Apr;22(6):1056-65. doi: 10.1017/s1368980018003336. PMID: 30522548.
122. Beck AL, Takayama JI, Halpern-Felsher B, et al. Understanding how Latino parents choose beverages to serve to infants and toddlers. *Matern Child Health J*. 2014 Aug;18(6):1308-15. doi: 10.1007/s10995-013-1364-0. PMID: 24077961.
123. Arons A, Bolbocean C, Bush NR, et al. Participation in the special supplemental nutrition program for women, infants, and children is not associated with early childhood socioemotional development: Results from a longitudinal cohort study. *Prev Med Rep*. 2016 Dec;4:507-11. doi: 10.1016/j.pmedr.2016.09.004. PMID: 27688993.
124. Jackson MI. Early childhood WIC participation, cognitive development and academic achievement. *Soc Sci Med*. 2015 Feb;126:145-53. doi: 10.1016/j.socscimed.2014.12.018. PMID: 25555255.
125. Bolbocean C, Tylavsky FA. The impact of safety net programs on early-life developmental outcomes. *Food Policy*. 2021;100doi: 10.1016/j.foodpol.2020.102018.
126. Early Intervention: Federal investments like WIC can produce savings (GAO/HRD-92-18) US General Accounting Office. 1992. <https://www.gao.gov/assets/hrd-92-18.pdf>
127. Bitler MP, Currie J. Does WIC work? The effects of WIC on pregnancy and birth outcomes. *J Policy Anal Manage*. 2005 Winter;24(1):73-91. doi: 10.1002/pam.20070. PMID: 15584177.
128. Institute of Medicine (US) Committee on Scientific Evaluation of WIC Nutrition Risk Criteria. WIC Nutrition Risk Criteria: A Scientific Assessment. Washington DC: National Academies Press (US); 1996.
129. Institute of Medicine Committee on Understanding Premature Birth Assuring Healthy Outcomes. The National Academies Collection: Reports funded by National Institutes of Health. In: Behrman RE, Butler AS, eds. Preterm Birth: Causes, Consequences, and Prevention. Washington (DC): National Academies Press (US) Copyright © 2007, National Academy of Sciences.; 2007.

130. Nianogo RA, Wang MC, Basurto-Davila R, et al. Economic evaluation of California prenatal participation in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) to prevent preterm birth. *Prev Med*. 2019 Jul;124:42-9. doi: 10.1016/j.ypmed.2019.04.011. PMID: 30998955.
131. Nuyt AM, Lavoie JC, Mohamed I, et al. Adult Consequences of Extremely Preterm Birth: Cardiovascular and Metabolic Diseases Risk Factors, Mechanisms, and Prevention Avenues. *Clin Perinatol*. 2017 Jun;44(2):315-32. doi: 10.1016/j.clp.2017.01.010. PMID: 28477663.
132. Schultz DJ, Byker Shanks C, Houghtaling B. The Impact of the 2009 Special Supplemental Nutrition Program for Women, Infants, and Children Food Package Revisions on Participants: A Systematic Review. *J Acad Nutr Diet*. 2015 Nov;115(11):1832-46. doi: 10.1016/j.jand.2015.06.381. PMID: 26276067.
133. Wilson MM, Reedy J, Krebs-Smith SM. American Diet Quality: Where It Is, Where It Is Heading, and What It Could Be. *J Acad Nutr Diet*. 2016 Feb;116(2):302-10.e1. doi: 10.1016/j.jand.2015.09.020. PMID: 26612769.
134. Nicklaus S, Boggio V, Chabanet C, et al. A prospective study of food variety seeking in childhood, adolescence and early adult life. *Appetite*. 2005 Jun;44(3):289-97. doi: 10.1016/j.appet.2005.01.006. PMID: 15927730.
135. Dattilo AM, Birch L, Krebs NF, et al. Need for early interventions in the prevention of pediatric overweight: a review and upcoming directions. *J Obes*. 2012;2012:123023. doi: 10.1155/2012/123023. PMID: 22675610.
136. Saavedra JM, Deming D, Dattilo A, et al. Lessons from the feeding infants and toddlers study in North America: what children eat, and implications for obesity prevention. *Ann Nutr Metab*. 2013;62 Suppl 3:27-36. doi: 10.1159/000351538. PMID: 23970213.
137. Fryar CD, Carroll MD, Afful J. Prevalence of Overweight, Obesity, and Severe Obesity Among Children and Adolescents Aged 2–19 Years: United States, 1963–1965 Through 2017–2018 NCHS Health E-Stats. 2020.
138. Freedman DS, Khan LK, Dietz WH, et al. Relationship of childhood obesity to coronary heart disease risk factors in adulthood: the Bogalusa Heart Study. *Pediatrics*. 2001 Sep;108(3):712-8. doi: 10.1542/peds.108.3.712. PMID: 11533341.
139. Public Law 108 - 265 - Child Nutrition and WIC Reauthorization Act of 2004. US Government Publishing Office. <https://www.govinfo.gov/app/details/PLAW-108publ265>. Accessed on April 16, 2021.
140. Public Law 105 - 336 - William F. Goodling Child Nutrition Reauthorization Act of 1998. U.S. Government Publishing Office. <https://www.govinfo.gov/app/details/PLAW-105publ336>. Accessed on April 16, 2021.
141. Lowe NK. The Surgeon General's call to action to support breastfeeding. *Journal of Obstetric, Gynecologic, & Neonatal Nursing: Clinical Scholarship for the Care of Women, Childbearing Families, & Newborns*. 2011;40(4):387-9. doi: 10.1111/j.1552-6909.2011.01266.x. PMID: 2011-15711-001.
142. Rivera AC. Impact and process evaluation of prenatal WIC on maternal and infant outcomes: ProQuest Information & Learning; 2009.
143. The Role of WIC in Reducing Maternal Mortality Position Paper National WIC Association. 2020. [https://s3.amazonaws.com/aws.upl/nwica.org/fy20\\_nwa\\_factsheet\\_reducing-maternal-mortality-position-paper.pdf](https://s3.amazonaws.com/aws.upl/nwica.org/fy20_nwa_factsheet_reducing-maternal-mortality-position-paper.pdf)
144. Sanson-Fisher RW, Bonevski B, Green LW, et al. Limitations of the randomized controlled trial in evaluating population-based health interventions. *Am J Prev Med*. 2007 Aug;33(2):155-61. doi: 10.1016/j.amepre.2007.04.007. PMID: 17673104.

145. Mueller M, D'Addario M, Egger M, et al. Methods to systematically review and meta-analyse observational studies: a systematic scoping review of recommendations. *BMC Med Res Methodol*. 2018 May 21;18(1):44. doi: 10.1186/s12874-018-0495-9. PMID: 29783954.
146. Creanga AA. Maternal Mortality in the United States: A Review of Contemporary Data and Their Limitations. *Clin Obstet Gynecol*. 2018 Jun;61(2):296-306. doi: 10.1097/grf.0000000000000362. PMID: 29561285.
147. Kreider B, Pepper JV, Roy M. Identifying the effects of WIC on food insecurity among infants and children. *Southern Economic Journal*. 2016;82(4):1106-22. doi: 10.1002/soej.12078.
148. Metallinos-Katsaras E, Gorman KS, Wilde P, et al. A longitudinal study of WIC participation on household food insecurity. *Matern Child Health J*. 2011 Jul;15(5):627-33. doi: 10.1007/s10995-010-0616-5. PMID: 20455015.
149. National Academies of Sciences Engineering and Medicine. Review of WIC Food Packages: Improving Balance and Choice: Final Report The National Academies Press. Washington, DC: 2017.
150. 2015 – 2020 Dietary Guidelines for Americans. 8th Edition U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015. <https://health.gov/our-work/food-nutrition/previous-dietary-guidelines/2015>

# Appendix A. Methods

## Details of Study Selection

Since we focused on outcomes associated with the WIC Program and current service provisions (considered from 2009 in terms of the food package changes, we searched primarily for original studies published since 2009 and containing data from 2009 or later. That was the earliest year we would expect to find a published study relevant to the WIC Program with the current food package.

We made three changes to the protocol through consultation with the AHRQ Task Order Officer and the review sponsor. Originally, we planned to only include studies with data from 2009 onwards for all outcomes. However, we expanded the inclusion criteria for mortality and child development outcomes to consider studies with data from 2000 onwards to ensure a larger evidence base, and with the shared understanding that the aspects of WIC services through which WIC participation would influence these outcomes were not altered by the changes in 2009. The second change related to the framing of the KQs with respect to maternal and child participation. We decided not to focus exclusively on studies of pregnant WIC participants, but to also include and report on the majority of studies of dietary outcomes of women and WIC involving respondents who may or may not be currently participating in WIC. Along with that, we included household purchasing studies which did not strictly align with either KQ. Despite their relative lack of applicability to the KQs, the findings of these studies expanded the evidence base regarding the outcomes of dietary intake for women, infants, and children. Third, breastfeeding was considered an outcome for both KQs, but in the report, it was described as part of KQ2.

## Search Strategy

**Literature Databases:** We searched the following databases for primary studies: PubMed, Embase®, CINAHL, ERIC, SCOPUS, PsycINFO, and the Cochrane Central Register of Controlled Trials. We conducted two literature searches in the following manner:

- a) **Original studies published since 2009:** We searched for studies on the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program published since 2009 and containing data from 2009 or later.
- b) **Original studies published before or after 2009 for the selected outcomes:** We conducted a targeted search for studies published since 2000 on the following selected outcomes that were not likely to be impacted by the 2009 food package changes or that were likely to have very limited data:
  - I. Infant mortality;
  - II. Maternal mortality;
  - III. Child development/school performance.

We developed a search strategy for PubMed, based on an analysis of the medical subject headings (MeSH) terms for all potentially relevant publications and text words of key articles identified a priori. We evaluated the search strategy by examining whether it retrieved a sample of key articles. We used a similar strategy in the other electronic sources. The detailed PubMed search strategy is listed below. The searches will be updated during the peer review process.

**Grey Literature:** To search for relevant grey literature, we manually searched the following six websites on March 11<sup>th</sup>, 2021:

1. Food and Nutrition Service -USDA (<https://www.fns.usda.gov/>)
2. Economic Research Services -USDA (<https://www.ers.usda.gov/>)
3. National WIC Association (<https://thewichub.org/>)
4. Mathematica (<https://www.mathematica.org/about-mathematica>)
5. Center on Budget and Policy Priorities (<https://www.cbpp.org/research/topics/child-nutrition-and-wic>)
6. Behavioral Economics and Healthy Food Choice Research (BECR), UNC (<https://hdpd.unc.edu/current-research/behavioral-economics-and-healthy-food-choice-research-becr/>)

**Hand Searching:** We supplemented the above mentioned searching by checking the reference lists of relevant reviews and reports that we found.

## **PubMed Search Strategy**

### **Original studies published since 2009**

(WIC program [mh] OR WIC [tiab] OR "Women, Infants, and Children"[tw] OR "WIC program"[All Fields] OR "WIC programs"[All Fields] OR "Special Supplemental Nutrition Program"[All Fields]) AND Publication date: 2009– early September 2021

Targeted search- Original studies published since 2000 for the selected outcomes

### **Mortality – infant and women**

(WIC [tiab] OR "Women, Infants, and Children"[tiab] OR "WIC program"[tiab] OR "WIC programs"[tiab] OR "Special Supplemental Nutrition Program"[tiab]) AND AND ("Infant mortality" [mh] OR "Infant death" [mh] OR "Fetal death" [mh] OR "maternal mortality" [mh] OR "maternal death" [mh] OR mortality [tw] OR morbidity [tw] OR death [tw] OR deaths [tw] OR deaths [tw] OR stillbirth [tw] OR "medical audit" [mh] OR "medical audit"[tiab]) AND Publication date: 2000– early September 2021

### **Child development**

(WIC [tiab] OR "Women, Infants, and Children"[tiab] OR "WIC program"[tiab] OR "WIC programs"[tiab] OR "Special Supplemental Nutrition Program"[tiab] AND ("Academic Performance" [mh] OR "School performance"[tw] OR "academic achievement"[tw] OR "Attention Deficit Disorder with Hyperactivity" [mh] OR "ADHD"[tw] OR "Autism Spectrum Disorder" [mh] OR autism [tw] OR "child development" [mh] OR "child development" [tw] OR "Behavioral development" [tw] OR Cognition [mh] OR "Cognitive development"[tw] OR "Mental development"[tw] OR "Cognitive performance"[tw] OR "Developmental Disabilities" [mh] OR "Developmental delays"[tw] OR "Language development"[mh] OR "Language development" [tw] OR "Motor development"[tw] OR "School attendance"[tw] OR readiness [tw])

OR "Verbal fluency"[tw] OR "Head Start"[tw] OR reading [tw] OR math [tw] AND Publication date: 2000– early September 2021

## Screening Process

We used DistillerSR (Evidence Partners, 2010) to manage the screening process. DistillerSR is a web-based database management program that manages all levels of the review process. All applicable citations identified by the search strategies were uploaded to the system and reviewed in the following manner:

i. **Abstract screening:** Two reviewers independently reviewed abstracts, which were excluded if both reviewers agreed that the article met one or more of the exclusion criteria [Table A-1 and A-2]. The articles were not excluded based on the study design or outcome at this level. Differences between reviewers regarding abstract eligibility were tracked and resolved through consensus adjudication. Relevant reports and reviews, including systematic reviews and meta-analyses, were tagged for hand searching of the references list.

ii. **Full-text screening:** Citations promoted based on abstract review underwent another independent parallel review using full text of the articles. The differences regarding article inclusion were tracked and resolved through consensus adjudication.

## Inclusion Criteria by PICOTS Element

Studies were selected for inclusion using pre-established criteria based on the Key Questions (KQ) and PICOTS framework (patients, interventions, comparisons, outcomes, timing, setting). A brief overview of the PICOTS inclusion criteria is provided here.

### Population(s):

- KQ1: Women who participated in WIC during pregnancy and their infants from birth to 28 days
- KQ2: Infants/Children who participated in WIC (ages from 29 days up to 5 years)

### Interventions:

- KQ1: Participation in WIC with service provisions (food package) from 2009 onwards, defined at a minimum as enrolling in WIC for one month or more.
- KQ2: Participation in WIC with service provisions (food package) from 2009 onwards, defined at a minimum as enrolling in WIC for one month or more

### Comparators:

- KQ1: Women who were eligible for WIC, but did not participate during pregnancy, and their infants from birth to 28 days; duration of WIC participation; exposure to pre-2009 service provisions (food package).
- KQ2: Infants/children who were eligible for WIC, but did not participate at the age studied (ages from 29 days up to 5 years); duration of WIC participation; exposure to pre-2009 service provisions (food package)



## Outcomes (Detailed list of outcomes located in Tables A-4 and A-5)

### *KQ1:*

- Maternal health outcomes
- Neonatal and birth outcomes
- Breastfeeding
- Dietary outcomes of mother

### *KQ2:*

- Infant and child outcomes
- Child anthropometric status or growth outcomes
- Breastfeeding
- Dietary outcomes of infants and children, household purchases and benefit redemption
- Child development/school performance

### Timing:

- Studies used data 2009 onwards.
- Studies published since 2009 that compare results before and after 2009 food package change.
- Studies not using data collected after 2009 will be included for specific key outcomes (maternal mortality, infant mortality, child development and academic achievement).

### Setting:

- Any jurisdiction served by a WIC state or local agency

### Type of study:

- Intervention trials (randomized and non-randomized), observational studies, quasi-experimental, before-after, interrupted time series, qualitative studies

## Criteria for Inclusion/Exclusion of Studies in the Review

The criteria for inclusion and exclusion of studies are briefly described in the previous PICOTS section and below in Table A-1 and A-2.

**Table A-1. PICOTS: Inclusion and exclusion criteria for quantitative studies**

| Criteria             | Inclusion   | Exclusion   |
|----------------------|---|---|
| <b>Population</b>    | KQ1: Women who participated in WIC during pregnancy and their infants up to age 28 days<br><br>KQ2: Infants/Children who participated in WIC (age > 28days and < 5 years) | <ul style="list-style-type: none"><li>• Animal studies</li></ul>  |
| <b>Interventions</b> | Intervention as defined by KQ1-2*   | <ul style="list-style-type: none"><li>• No intervention of interest</li></ul>                                 |
| <b>Comparisons</b>   | Comparison as defined by KQ1-2*   | <ul style="list-style-type: none"><li>• Studies that do not report a comparison group KQ1-2 *</li></ul>       |
| <b>Outcomes</b>      | All studies must evaluate an outcome of interest as defined by KQ1-2*   | <ul style="list-style-type: none"><li>• Studies that do not report any of the outcomes of interest.</li></ul> |

| Criteria      | Inclusion            | Exclusion   |
|---------------|----------------------|---|
| Type of Study | As defined by KQ1-2* | <ul style="list-style-type: none"> <li>Studies published before 2009 or that only use data collected before 2009 for all the outcomes except maternal mortality, infant mortality, and child development/school performance</li> <li>Publications with no original data (e.g., editorials, letters, comments, reviews)</li> <li>Full text not presented or unavailable, abstracts only</li> <li>WIC program materials, brochures, and training manuals</li> <li>Descriptions of WIC participation levels and participant characteristics without outcome data</li> <li>Descriptive research on WIC implementation, operations, and program costs</li> </ul> |

KQ=Key Question; WIC= Supplemental Nutrition Program for Women, Infants, and Children

\*Please see PICOTS inclusion criteria

**Table A-2. Additional inclusion and exclusion criteria for qualitative and mixed-methods studies**

| Criteria      | Inclusion  | Exclusion   |
|---------------|--|---|
| Comparison    | No comparison group needed   | No exclusion  |
| Type of study | Qualitative or mixed-methods studies (e.g., interviews, focus group) that assess perceptions/experiences of WIC participants and/or staff, or barriers/facilitators relevant to outcomes of interest | Studies of barriers/facilitators related to WIC participation but not linked to outcome |

WIC= Supplemental Nutrition Program for Women, Infants, and Children

## Data Extraction

We used a systematic approach to extract all data to minimize the risk of bias or error in this process. We created and pilot tested standardized forms for data extraction. Each article underwent double review by the study investigators for data abstraction. The second reviewer confirmed the first reviewer's abstracted data for completeness and accuracy. A third reviewer audited a random sample of articles by the first two reviewers to ensure consistency in the data abstraction of the articles.

For all included articles, reviewers extracted information on general study characteristics, WIC program characteristics, study participant characteristics, eligibility criteria and the results of each outcome. We completed the data abstraction process using forms created in Excel (Microsoft, Redmond, WA). The Excel files were used to maintain the data and to create detailed evidence tables and summary tables. Missing data was recorded as "not reported" and the variables were not dropped from the report. Studies generally did not report enough data to support calculation of standardized mean differences or data conversion. We also identified and summarized qualitative studies capturing WIC participant or staff perceptions/experiences that were linked to specific participant characteristics or an outcome.

## Risk of Bias Assessment of Individual Studies

Two reviewers independently assessed risk of bias for each study. We used the EPHPP (Effective Public Health Practice Project) tool.<sup>1</sup> Differences between reviewers were resolved through consensus adjudication. The EPHPP was used to assess the risk of bias by considering five components of study methodology. The components of study methodology considered were

selection bias, study design, presence of confounders, validity and reliability of data collection methods, and study dropouts and withdrawals. Studies received domain-specific ratings as “strong”, “moderate” or “weak” according to the EPHPP algorithm. Each study also received a global risk of bias rating: “strong” if none of the domains were rated as weak, “moderate” if only one of the domains was rated as weak, or “weak” if two or more of the domains were rated as weak. We did not assess blinding because blinding generally was not feasible in the studies of the WIC Program.

## Grading the Strength of the Body of Evidence

We graded the strength of evidence from quantitative studies by using the grading scheme recommended by the Agency for Healthcare Research and Quality (AHRQ) Methods Guide for Conducting Comparative Effectiveness Reviews.<sup>2</sup> The strength of evidence grades were based on the following domains:

- Study limitations [low, medium, or high level of study limitation] - Rated according to the degree to which studies for a given outcome are likely to reduce bias based on study design and conduct across individual studies
- Directness [direct or indirect]-Rated by degree to which the outcome is directly or indirectly related to health outcomes of interest.
- Consistency [consistent, inconsistent, or unknown/not applicable]- Rated by degree to which studies find similar magnitude of effect or same direction of effect.
- Precision [precise or imprecise]- Describes the level of certainty of the estimate of effect for a particular outcome with a precise estimate being one that allows a clinically useful conclusion. This may be based on sufficiency of sample size and number of events, and if these are adequate, the interpretation of the confidence interval.

We did not formally assess potential reporting bias [suspected or undetected] because of the lack of reliable methods for detecting reporting bias in the types of observational studies that were included in this review. These domains were used qualitatively to assign a strength of evidence rating as being high, moderate, low, or insufficient for each key outcome after discussion by two reviewers [Table A-3]. To ensure consistency and validity of the assessment, the strength of evidence grades were reviewed by the entire team of investigators prior to assigning a final grade.

**Table A-3. Definitions of the grades of overall strength of evidence.**

| Grade        | Definition  |
|--------------|---|
| High         | We are very confident that the estimate of effect lies close to the true effect for this outcome. The body of evidence has few or no deficiencies. We believe that the findings are stable (i.e., another study would not change the conclusions).  |
| Moderate     | We are moderately confident that the estimate of effect lies close to the true effect for this outcome. The body of evidence has some deficiencies. We believe that the findings are likely to be stable, but some doubt remains.   |
| Low          | We have limited confidence that the estimate of effect lies close to the true effect for this outcome. The body of evidence has major or numerous deficiencies (or both). We believe that additional evidence is needed before concluding either that the findings are stable or that the estimate of effect is close to the true effect. |
| Insufficient | We have no evidence, we are unable to estimate an effect, or we have no confidence in the estimate of effect for this outcome. No evidence is available, or the body of evidence has unacceptable deficiencies, precluding reaching a conclusion.   |

## Peer Review and Public Commentary

Experts and individuals representing stakeholder and user communities were invited to provide external peer review of this systematic review. AHRQ representatives and an associate editor also provided comments. We addressed all reviewer comments, revising the text as appropriate. The peer-reviewed draft report was posted on the AHRQ website for four weeks to elicit public comment. We addressed all public reviewer comments, revising the text as appropriate and documented responses in a disposition of comments report that will be made available 3 months after AHRQ posts the final systematic review on the EHC website.

**Table A-4. Detailed list of maternal, neonatal, and birth outcomes (KQ1)**

| Outcomes Category   | Outcomes   | Measures  |
|---|--|---|
| <b>Maternal health outcomes [health risk] in:</b> <ul style="list-style-type: none"> <li>➤ <b>Pregnancy</b></li> <li>➤ <b>Postpartum</b></li> </ul> | Mortality  | Pregnancy-related death (while pregnant or within a year of the pregnancy ending)   |
|   | Morbidity  | Gestational hypertension<br>Anemia (Iron deficiency, Iron-deficiency anemia, Nutritional anemias)<br>Preeclampsia<br>Gestational diabetes   |
|   | Mode of delivery   | Cesarean/Vaginal  |
|   | Weight status (e.g. BMI, underweight, overweight, obesity) | Pregnancy,<br>Postpartum obesity<br>Postpartum weight retention   |
|   | Gestational weight gain                                    | Total gestational weight gain;<br>IOM rec by BMI: under, within, over   |
|   | Maternal health behaviors                                  | Smoking<br>Alcohol use  |
|   | Healthcare utilization                                     | Utilization of recommended prenatal care, postpartum care and other health maintenance recommendations<br>Inter-pregnancy interval  |
|   |  |   |
| <b>Neonatal and birth outcomes</b>  | Fetal death, stillbirth and neonatal mortality,            | As reported   |
|   | Gestational age  | Preterm,<br>late preterm,<br>early term,<br>term and late term  |
|   | Birth weight   | Very low birth weight<br>Low birth weight,<br>Normal birth weight<br>High birth weight  |
|   | Small for gestational age<br>Large for gestational age     | As reported   |
|   | NICU admission, hospital length of stay                    | As reported   |
| <b>Dietary outcomes</b>   | Dietary practices of mothers, breastfeeding, diet quality  | Breastfeeding (intention, initiation, and duration of any breastfeeding)<br>Dietary intake (nutrient intake); diet quality measures (HEI, AHEI, DASH/Medical); glycemic load; servings of food groups, variety, adequacy and moderation components, SSB, sodium/salt, EFA); nutrient density (% fat, and by type; %CHO) |
|   | Household food security                                    | e.g., 18-item USDA Household Food Security Scale  |

AHEI=Alternative Healthy Eating Index; Approaches to Stop Hypertension; BMI=Body mass index; CHO= Carbohydrates; DASH =Dietary; EFA=Essential Fatty Acids; GDM=Gestational diabetes mellitus; HEI =Healthy Eating Index; NICU= Neonatal Intensive Care Unit; PIH=pregnancy-induced hypertension; PROM =Pre-labor rupture of membranes; SSB =sugar-sweetened

beverage; USDA =United States Department of Agriculture; WIC = Special Supplemental Nutrition Program for Women, Infants and Children

**Table A-5. Detailed list of infant and child's dietary and health outcomes (KQ2)**

| <b>Outcomes Category</b>                              | <b>Outcomes</b>   | <b>Measures</b>  |
|---|---|--|
| <b>Health outcomes</b>                                | Mortality   | Infant mortality<br>Child mortality  |
|   | Morbidity   | Health status, hospitalization   |
|   | Anemia<br>Iron deficiency anemia,<br>nutritional anemias, iron<br>deficiency  | <b>As reported</b>   |
|   | Healthcare utilization  | Well child visits<br>Immunization status   |
| <b>Child anthropometric status or growth outcomes</b> | Child anthropometric status or growth outcomes  | weight-for-age, length- or height-for-age, weight-for-length, or weight-for-height percentile or Z-score, BMI-for-age percentile or Z-score, underweight, obesity, growth velocity (change in size/status or z-score over time)  |
| <b>Dietary outcomes</b>                               | Dietary practices of infants and children   | Infants: maternal intention to breastfeed; Ever breastfed or any breastfeeding; Exclusive breastfeeding (initiation and duration); Duration of any breastfeeding; introduction of formula (timing); timing of solids introduction (< 4 months, < 6 months); cereal in the bottle; timing of cow's milk introduction (< 12 months); food group servings; nutrient intakes<br><br>Children (1-2):<br>food group servings, groups for variety, adequacy and moderation; added sugars, SSB, type of milk; fruit juice; dietary diversity; nutrient intakes, nutrient density measures (iron, zinc, calcium, %fat (total and by type)) energy density |
|   | Diet quality  | Children 2-5: [HEI, AHEI, food group servings (adequacy and moderation, added sugars, SSB), type of milk; fruit juice]<br>Nutrient intakes and nutrient density measures (iron, zinc, calcium, %fat (total and by type)) energy density  |
|   | Food purchasing behavior at the participant or household level  | Benefit redemption, purchasing surveys   |
|   | Household and child food security   | 18-item USDA Household Food Security Scale   |
| <b>Child development and academic achievement</b>     | Child development (cognitive development, social development, motor development, communication and adaptive behavior, development risk) | BSID II/III; WPPSI, WISC, other standardized measures or specific constructs   |
|   | Academic achievement  | Pre-school or Head Start (e.g., attendance, behavior) K-12 educational performance, school-related factors (e.g. attendance, behavior)   |

ADHD =Attention deficit hyperactivity disorder; AHEI=Alternative Healthy Eating Index; BMI=body mass index; BSID =Bayley Scales of Infant Development; HEI =Healthy Eating Index; SSB =sugar-sweetened beverage; WISC=Wechsler Intelligence Scale for Children; WPPSI = Wechsler Preschool and Primary Scale of Intelligence

## References for Appendix A

1. Quality Assessment Tool for Quantitative Studies. Effective Public Healthcare Panacea Project; 2021.  
<https://www.ephp.ca/quality-assessment-tool-for-quantitative-studies/>. Accessed on November 23, 2021.
2. Methods Guide for Effectiveness and Comparative Effectiveness Reviews. AHRQ Publication No. 10(14)-EHC063-EF Agency for Healthcare Research and Quality. Rockville, MD: 2014.  
[www.effectivehealthcare.ahrq.gov](http://www.effectivehealthcare.ahrq.gov)

## Appendix B. List of Excluded Studies

1. A qualitative analysis of text message conversations in a breastfeeding peer counselling intervention. Maternal & child nutrition. 2019doi: 10.1111/mcn.12904. PMID: CN-02093618. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
2. Delivering Summer Electronic Benefit Transfers for Children through the Supplemental Nutrition Assistance Program or the Special Supplemental Nutrition Program for Women, Infants, and Children: benefit Use and Impacts on Food Security and Foods Consumed. Journal of the academy of nutrition & dietetics. 2017;117(3):367-75. doi: 10.1016/j.jand.2016.11.002. PMID: CN-01474693. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
3. National, state, and local area vaccination coverage among children aged 19-35 months - United States, 2011. MMWR: Morbidity & Mortality Weekly Report. 2012;61(35):689-96. PMID: 104504357. Corporate Author: Centers for Disease Control and Prevention (CDC). **-No mention of WIC program**
4. Obesity prevalence among low-income, preschool-aged children--New York City and Los Angeles County, 2003-2011. MMWR Morb Mortal Wkly Rep. 2013 Jan 18;62(2):17-22. PMID: 23325351. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
5. Perception of Insufficient Milk in Low-Income Women, Infants, and Children Participants. Journal of Midwifery & Women's Health. 2012;57(5):536-7. doi: 10.1111/j.1542-2011.2012.00221.x. PMID: 104502792. **- Conference/meeting abstract**
6. The Feeding Young Children Study: Preliminary Results from a WIC-based Bottle Weaning Intervention. Journal of Nutrition Education & Behavior. 2012;44(4 Supplement):S83-S. doi: 10.1016/j.jneb.2012.03.202. PMID: 77564478. **- Conference/meeting abstract**
7. Theory of Planned Behavior: Application to Soy Milk Intake of WIC Participants. Journal of Nutrition Education & Behavior. 2012;44(4 Supplement):S72-S. doi: 10.1016/j.jneb.2012.03.168. PMID: 77546865. **- Conference/meeting abstract**
8. WIC Participants' Perceived Benefits and Barriers of Using Their Fruit and Vegetable Food Checks at a Certified Farmers' Market. Journal of Nutrition Education & Behavior. 2012;44(4 Supplement):S76-S7. doi: 10.1016/j.jneb.2012.03.180. PMID: 77547291. **- Conference/meeting abstract**
9. Abrams SA, Avalos A, Gray M, et al. High Level of Food Insecurity



- among Families with Children Seeking Routine Care at Federally Qualified Health Centers during the Coronavirus Disease 2019 Pandemic. *J Pediatr* X. 2020 Fall;4:100044. doi: 10.1016/j.ympdx.2020.100044. PMID: 32864604. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
10. Adedze P, Chapman-Novakofski K, Witz K, et al. Knowledge, attitudes, and beliefs about nutrition and childhood overweight among WIC Participants. *Fam Community Health*. 2011 Oct-Dec;34(4):301-10. doi: 10.1097/FCH.0b013e31822b53dd. PMID: 21881417. **-No data since 2009**
  11. Adynski H, Schwartz TA, Santos HP. Does Participation in Food Benefit Programs Reduce the Risk for Depressive Symptoms? *J Am Psychiatr Nurses Assoc*. 2021 Jan 3:1078390320983904. doi: 10.1177/1078390320983904. PMID: 33393431. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  12. Ahmed AH, Rojjanasrirat W. Breastfeeding Outcomes, Self-Efficacy, and Satisfaction Among Low-Income Women With Late-Preterm, Early-Term, and Full-Term Infants. *J Obstet Gynecol Neonatal Nurs*. 2021 Sep;50(5):583-96. doi: 10.1016/j.jogn.2021.06.010. PMID: 34390676. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  13. Aldrich H, Gance-Cleveland B. Comparing Weight-for-Length Status of Young Children in Two Infant Feeding Programs. *Matern Child Health J*. 2016 Dec;20(12):2518-26. doi: 10.1007/s10995-016-2077-y. PMID: 27485490. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  14. Alfonso VH. Assessing risk factors for adverse birth outcomes and early childhood respiratory illness: an examination of supplement initiation and participation in Special Supplemental Nutrition Program for Women, Infants and Children during pregnancy: ProQuest Information & Learning; 2016. **-Relevant Systematic Review or Dissertation that applies to the question**
  15. Altindag O, Joyce TJ, Reeder JA. Can Nonexperimental Methods Provide Unbiased Estimates of a Breastfeeding Intervention? A Within-Study Comparison of Peer Counseling in Oregon. *Eval Rev*. 2019 Jun-Aug;43(3-4):152-88. doi: 10.1177/0193841x19865963. PMID: 31390890. **-No data since 2009**
  16. Amaro-Rivera K, Molina J, Pérez CM, et al. Longitudinal Associations between Dietary Patterns and Weight Status in Puerto Rican Infants and Toddlers' Participants of the WIC Program. *P R Health Sci J*. 2019 Jun;38(2):75-80. PMID: 31260549. **-Does not contain a comparison group or address the association**

**between WIC participation and an outcome of interest**

17. Anderson J, Hayes D, Chock L. Characteristics of overweight and obesity at age two and the association with breastfeeding Hawai'i Women, Infants, and Children (WIC) participants. *Maternal and Child Health Journal*. 2014;18(10):2323-31. doi: 10.1007/s10995-013-1392-9. PMID: 2013-38463-001. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
18. Anderson KE, Nicklas JC, Spence M, et al. Roles, perceptions and control of infant feeding among low-income fathers. *Public Health Nutr*. 2010 Apr;13(4):522-30. doi: 10.1017/s1368980009991972. PMID: 20082747. **-No data since 2009**
19. Andress L, Fitch C. Juggling the five dimensions of food access: Perceptions of rural low income residents. *Appetite*. 2016 Oct 1;105:151-5. doi: 10.1016/j.appet.2016.05.013. PMID: 27208595. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
20. Andreyeva T, Luedicke J, Henderson KE, et al. Grocery store beverage choices by participants in federal food assistance and nutrition programs. *Am J Prev Med*. 2012 Oct;43(4):411-8. doi: 10.1016/j.amepre.2012.06.015. PMID: 22992359. **-Does not contain a comparison group or address the**

**association between WIC participation and an outcome of interest**

21. Andreyeva T, Luedicke J, Middleton AE, et al. Positive influence of the revised Special Supplemental Nutrition Program for Women, Infants, and Children food packages on access to healthy foods. *J Acad Nutr Diet*. 2012 Jun;112(6):850-8. doi: 10.1016/j.jand.2012.02.019. PMID: 22709812. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
22. Anne Gilmore L, Klempel MC, Martin CK, et al. Personalized Mobile Health Intervention for Health and Weight Loss in Postpartum Women Receiving Women, Infants, and Children Benefit: a Randomized Controlled Pilot Study. *Journal of women's health*. 2017;26(7):719-24. doi: 10.1089/jwh.2016.5947. PMID: CN-01395127. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
23. AnneKelly E, Plagge T, McKinney DN, et al. Contribution of Maternal Factors to Infant Mortality from Extreme Preterm Birth. *Obstetrics and Gynecology*. 2019;133(SUPPL 1)doi: 10.1097/01.AOG.0000559056.34274.54. **- Conference/meeting abstract**
24. Aoki Y, Brody DJ. WIC Participation and Blood Lead Levels among Children 1-5 Years: 2007-2014. *Environ Health Perspect*. 2018 Jun;126(6):067011. doi:

- 10.1289/ehp2384. PMID: 29961657.  
**-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
25. Arevalos L, Nicholson L, Papathakis P. Exclusive breastfeeding protective for growth trajectory to 5 years in a WIC cohort. *FASEB Journal*. 2015;29(1). - **Conference/meeting abstract**
  26. Armstrong Florian T, Winham D. Low Utilization of SNAP and TANF by EFNEP and WIC Participants. *Journal of Nutrition Education & Behavior*. 2013;45(4 Supplement):S52-S. doi: 10.1016/j.jneb.2013.04.140. PMID: 107959388. - **Conference/meeting abstract**
  27. Arteaga I, Heflin C, Gable S, et al. Families with Hungry Children and the Transition from Preschool to Kindergarten. University of Kentucky Center for Poverty Research Discussion Paper Series, DP2012-19 University of Kentucky Center for Poverty Research. 1936-9379. 2012.  
<http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=eric&AN=ED574665&site=ehost-live&scope=site&authtype=ip,shib&custid=s3555202> -**No original data**
  28. Arteaga I, Heflin C, Gable S. The impact of aging out of WIC on food security in households with children. *Children and Youth Services Review*. 2016;69:82-96. doi: 10.1016/j.childyouth.2016.07.015. - **No data since 2009**
  29. Assibey-Mensah V, Suter B, Thevenet-Morrison K, et al. Effectiveness of Peer Counselor Support on Breastfeeding Outcomes in WIC-Enrolled Women. *J Nutr Educ Behav*. 2019 Jun;51(6):650-7. doi: 10.1016/j.jneb.2019.03.005. PMID: 30981656. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  30. Atehortua NA. The role of acculturation in nutrition behaviors among low income Hispanic women living in Texas: ProQuest Information & Learning; 2013. - **Relevant Systematic Review or Dissertation that applies to the question**
  31. Atreya M, Muglia L, Greenberg J, et al. Racial Differences in the Influence of Interpregnancy Interval on Fetal Growth. *Maternal & Child Health Journal*. 2017;21(3):562-70. doi: 10.1007/s10995-016-2140-8. PMID: 121919511. **-No mention of WIC program**
  32. Au L, Whaley S, Gurzo K, et al. If You Build It They Will Come: satisfaction of WIC Participants With Online and Traditional In-Person Nutrition Education. *Journal of nutrition education and behavior*. 2016;48(5):336-42. doi: 10.1016/j.jneb.2016.02.011. PMID: CN-01472807. **-Does not provide any outcome of interest**
  33. Au L, Whaley S, Rosen N, et al. A randomized controlled trial evaluating online to in person education to improve breakfast behaviors, beliefs and knowledge in WIC Participants. *FASEB Journal*.

2015;29(1). - **Conference/meeting abstract**

34. Au L, Whaley S, Rosen NJ, et al. Online and in-person nutrition education reduces sodium intake: A randomized trial to assess knowledge, self-efficacy and behaviors in WIC Participants. FASEB Journal. 2016;30. - **Conference/meeting abstract**
35. Au LE, Gurzo K, Paolicelli C, et al. Diet Quality of US Infants and Toddlers 7-24 Months Old in the WIC Infant and Toddler Feeding Practices Study-2. J Nutr. 2018 Nov 1;148(11):1786-93. doi: 10.1093/jn/nxy192. PMID: 30383276. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
36. Au LE, Paolicelli C, Gurzo K, et al. Contribution of WIC-Eligible Foods to the Overall Diet of 13- and 24-Month-Old Toddlers in the WIC Infant and Toddler Feeding Practices Study-2. J Acad Nutr Diet. 2019 Mar;119(3):435-48. doi: 10.1016/j.jand.2018.11.001. PMID: 30638822. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
37. Au LE, Ritchie LD, Tsai M, et al. Alignment of California WIC Participant Preferences With Proposed WIC Food Package Recommendations. J Nutr Educ Behav. 2021 Jan;53(1):60-6. doi: 10.1016/j.jneb.2020.09.014. PMID: 33144073. -**Does not contain a comparison group or address the**

**association between WIC participation and an outcome of interest**

38. Au LE, Whaley S, Rosen NJ, et al. Online and In-Person Nutrition Education Improves Breakfast Knowledge, Attitudes, and Behaviors: A Randomized Trial of Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children. J Acad Nutr Diet. 2016 Mar;116(3):490-500. doi: 10.1016/j.jand.2015.10.012. PMID: 26669795. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
39. Au LE, Whaley SE, Gurzo K, et al. Evaluation of Online and In-Person Nutrition Education Related to Salt Knowledge and Behaviors among Special Supplemental Nutrition Program for Women, Infants, and Children Participants. J Acad Nutr Diet. 2017 Sep;117(9):1384-95. doi: 10.1016/j.jand.2016.12.013. PMID: 28196620. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
40. Avchen RN. An evaluation of Florida WIC in relation to educational outcomes. (nutrition, scholastic achievement). US: ProQuest Information & Learning; 2000. - **No original data (opinion, descriptive data, letters, editorial, commentary)**
41. Bably MB, Laditka SB, Paul R, et al. Age of Bottle Cessation and BMI-for-Age Percentile among Children

- Aged Thirty-Six Months  
Participating in WIC. Child Obes.  
2021 Sep 22doi:  
10.1089/chi.2021.0119. PMID:  
34551266. **-Does not contain a  
comparison group or address the  
association between WIC  
participation and an outcome of  
interest**
42. Baer R, Chambers CD, Jelliffe-  
Pawlowski LL. Risk of preterm birth  
among pregnant Medi-Cal  
participants with mental illness.  
American Journal of Obstetrics and  
Gynecology. 2016;214(1):S221. -  
**Conference/meeting abstract**
  43. Baer RJ, Chambers BD, Coleman-  
Phox K, et al. 196: Odds of early  
birth by class of obesity in a  
propensity matched sample.  
American Journal of Obstetrics and  
Gynecology. 2020;222(1):S136. doi:  
10.1016/j.ajog.2019.11.212. -  
**Conference/meeting abstract**
  44. Baer RJ, Chambers CD, Oltman SP,  
et al. Sexually transmitted infection  
and risk of preterm or early term  
birth. American Journal of Obstetrics  
and Gynecology. 2018;218(1):S423-  
S4. - **Conference/meeting abstract**
  45. Bai Y, Wunderlich SM, Fly AD.  
Predicting intentions to continue  
exclusive breastfeeding for  
6 months: a comparison among  
racial/ethnic groups. Matern Child  
Health J. 2011 Nov;15(8):1257-64.  
doi: 10.1007/s10995-010-0703-7.  
PMID: 21057864. **-Does not contain  
a comparison group or address the  
association between WIC  
participation and an outcome of  
interest**
  46. Baidal JW, Nelson C, Perkins M, et  
al. Childhood obesity prevention in  
wic: Outcomes of the ma-cord study.  
Journal of Pediatric  
Gastroenterology and Nutrition.  
2017;65:S196. doi:  
10.1097/MPG.0000000000001805. -  
**Conference/meeting abstract**
  47. Bailey ADL, Fulgoni Iii VL, Shah N,  
et al. Nutrient Intake Adequacy from  
Food and Beverage Intake of US  
Children Aged 1-6 Years from  
NHANES 2001-2016. Nutrients.  
2021 Mar 3;13(3)doi:  
10.3390/nu13030827. PMID:  
33802295. **-Does not contain a  
comparison group or address the  
association between WIC  
participation and an outcome of  
interest**
  48. Bailey ADL, Fulgoni VL, III, Shah  
N, et al. Nutrient intake adequacy  
from food and beverage intake of us  
children aged 1–6 years from nhanes  
2001–2016. Nutrients. 2021;13(3):1-  
13. doi: 10.3390/nu13030827. **-Does  
not contain a comparison group or  
address the association between  
WIC participation and an outcome  
of interest**
  49. Bailey RL, Jun S, Eldridge AL. The  
2016 Feeding Infants and Toddlers  
Study (FITS): Dietary Intakes and  
Practices of Children in the United  
States from Birth to 48 Months.  
Nestle Nutr Inst Workshop Ser.  
2019;91:99-109. doi:  
10.1159/000493701. PMID:  
30865963. **-Does not contain a  
comparison group or address the  
association between WIC  
participation and an outcome of  
interest**

50. Ball KA. Rural low-income mothers' perspectives on children's feeding practices: ProQuest Information & Learning; 2012. **-Relevant Systematic Review or Dissertation that applies to the question**
51. Ball KL. A community-based participatory research approach to implementing a farmers' market targeting wic farmers' market nutrition program participants: ProQuest Information & Learning; 2015. **-Relevant Systematic Review or Dissertation that applies to the question**
52. Ball L, Andrews J, Gruber K, et al. Implementation of a WIC clinic farmers' market improves accessibility and consumption of fresh fruits and vegetables among WIC farmers' market nutrition program participants. Journal of Hunger and Environmental Nutrition. 2019;14(6):838-49. doi: 10.1080/19320248.2018.1491364. **- Does not apply to any of the Key Questions**
53. Banach LP. Hospitalization: Are We Missing an Opportunity to Identify Food Insecurity in Children? Acad Pediatr. 2016 Jul;16(5):438-45. doi: 10.1016/j.acap.2016.01.002. PMID: 26785379. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
54. Banna J, Campos M, Gibby C, et al. Multi-site trial using short mobile messages (SMS) to improve infant weight in low-income minorities: Development, implementation, lessons learned and future applications. Contemp Clin Trials. 2017 Nov;62:56-60. doi: 10.1016/j.cct.2017.08.011. PMID: 28827160. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
55. Barbosa CE. Barriers and facilitators to infant feeding among low-income african american women: ProQuest Information & Learning; 2015. **- Relevant Systematic Review or Dissertation that applies to the question**
56. Barnes C, Petry S. "It Was Actually Pretty Easy": COVID-19 Compliance Cost Reductions in the WIC Program. Public Adm Rev. 2021 Sep 9doi: 10.1111/puar.13423. PMID: 34548698. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
57. Barratt M, Fener E. Infancy research, Policy, and Practice. The Wiley-Blackwell Handbook of Infant Development: Second Edition. Vol. 2. Wiley-Blackwell; 2010:380-400. **- No original data**
58. Barroso CS, Roncancio A, Moramarco MW, et al. Food security, maternal feeding practices and child weight-for-length. Appl Nurs Res. 2016 Feb;29:31-6. doi: 10.1016/j.apnr.2015.03.009. PMID: 26856485. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
59. Bartholomew JB, Miller BM, Ciccolo JT, et al. Walk Texas! 5-A-

Day intervention for Women, Infant, and Children (WIC) clients: a quasi-experimental study. *J Community Health*. 2008 Oct;33(5):297-303. doi: 10.1007/s10900-008-9103-y. PMID: 18484171. - **Does not provide any OUTCOME of interest (Mortality, children development)**

60. Beal AC, Kuhlthau K, Perrin JM. Breastfeeding advice given to African American and white women by physicians and WIC counselors. *Public Health Rep*. 2003 Jul-Aug;118(4):368-76. doi: 10.1093/phr/118.4.368. PMID: 12815087. - **Does not provide any OUTCOME of interest (Mortality, children development)**
61. Beal JA. Childhood Food Insecurity. *MCN Am J Matern Child Nurs*. 2020 Nov/Dec;45(6):373. doi: 10.1097/nmc.0000000000000664. PMID: 33074915. -**No original data**
62. Bechard L, Quann E, Reidy K, et al. The contribution of desserts and sweets to the diets of infants, toddlers and preschoolers in the US. *Journal of Pediatric Gastroenterology and Nutrition*. 2016;63:S399-S400. doi: 10.1097/01.mpg.0000503536.79797.66. - **Conference/meeting abstract**
63. Bekemeier B, Grembowski D, Yang YR, et al. Local public health delivery of maternal child health services: are specific activities associated with reductions in Black-White mortality disparities? *Matern Child Health J*. 2012 Apr;16(3):615-23. doi: 10.1007/s10995-011-0794-9. PMID: 21505777. -**Does not contain a comparison group or address the association between WIC**

## **participation and an outcome of interest**

64. Bell A, Oltman SP, Baer R, et al. 990 Factors associated with preterm birth among california youth. *American Journal of Obstetrics and Gynecology*. 2021;224(2):S614. doi: 10.1016/j.ajog.2020.12.1015. - **Conference/meeting abstract**
65. Benjamin-Neelon SE, Allen C, Neelon B. Household Food Security and Infant Adiposity. *Pediatrics*. 2020 Sep;146(3)doi: 10.1542/peds.2019-3725. PMID: 32859735. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
66. Bennett CF, Grassley JS. A Community Partnership to Support Breastfeeding Mothers of Late Preterm Infants. *Nurs Womens Health*. 2017 Aug-Sep;21(4):274-82. doi: 10.1016/j.nwh.2017.06.004. PMID: 28784208. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
67. Bennion KA, Tate D, Muñoz-Christian K, et al. Impact of an Internet-Based Lifestyle Intervention on Behavioral and Psychosocial Factors During Postpartum Weight Loss. *Obesity*. 2020doi: 10.1002/oby.22921. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
68. Bensley RJ, Anderson JV, Brusk JJ, et al. Impact of internet vs traditional

- Special Supplemental Nutrition Program for Women, Infants, and Children nutrition education on fruit and vegetable intake. J Am Diet Assoc. 2011 May;111(5):749-55. doi: 10.1016/j.jada.2011.02.010. PMID: 21515124. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
69. Berkowitz SA, Seligman HK, Choudhry NK. Treat or eat: food insecurity, cost-related medication underuse, and unmet needs. Am J Med. 2014 Apr;127(4):303-10.e3. doi: 10.1016/j.amjmed.2014.01.002. PMID: 24440543. **-Does not provide any outcome of interest**
  70. Berkowitz SS. Another Look at WIC's Breastfeeding Data: State Totals Reveal More Than Regional Averages. J Hum Lact. 2019 Feb;35(1):37-41. doi: 10.1177/0890334418797318. PMID: 30231211. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  71. Bermúdez-Millán Á, Hromi-Fiedler A, Damio G, et al. Egg contribution towards the diet of pregnant latinas. Ecology of Food and Nutrition. 2009;48(5):383-403. doi: 10.1080/03670240903170517. **-Does not provide any outcome of interest**
  72. Bernal D. The Effect of a Peer Counseling Support Program on Breastfeeding Initiation, Duration and Exclusivity among Low-Income Hispanic Women. Effect of a Peer Counseling Support Program on Breastfeeding Initiation, Duration & Exclusivity among Low-Income Hispanic Women. 2018:1-. PMID: 136077314. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  73. Bernal D. The effect of a peer counseling support program on breastfeeding initiation, duration and exclusivity among low-income Hispanic women: ProQuest Information & Learning; 2019. - **Relevant Systematic Review or Dissertation that applies to the question**
  74. Bertmann FMW. An exploration of attitudes and perceptions of cash value vouchers in the Arizona Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): ProQuest Information & Learning; 2014. - **Relevant Systematic Review or Dissertation that applies to the question**
  75. Biediger-Friedman L, Silva M, Crixell S, et al. Intent to Use WIC Smartphone Application to Promote Breastfeeding, Physical Activity, and Healthy Eating in WIC Participants. Journal of Nutrition Education & Behavior. 2015;47:S55-6. doi: 10.1016/j.jneb.2015.04.147. PMID: 109831957. - **Conference/meeting abstract**
  76. Birkett D, Johnson D, Thompson JR, et al. Reaching low-income families: Focus group results provide direction for a behavioral approach to WIC services. Journal of the American Dietetic Association. 2004;104(8):1277-80. doi:



- 10.1016/j.jada.2004.05.211. - **Does not provide any OUTCOME of interest (Mortality, children development)**
77. Bixenstine PJ, Cheng TL, Cheng D, et al. Association Between Preconception Counseling and Folic Acid Supplementation Before Pregnancy and Reasons for Non-Use. *Matern Child Health J.* 2015 Sep;19(9):1974-84. doi: 10.1007/s10995-015-1705-2. PMID: 25663654. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  78. Black MM, Armstrong B. Building Healthy Development and Behavior Among WIC Participants. *J Dev Behav Pediatr.* 2017 Jun;38(5):347-8. doi: 10.1097/dbp.0000000000000451. PMID: 28538043. -**No original data**
  79. Black MM, Hurley KM, Oberlander SE, et al. Participants' comments on changes in the revised special supplemental nutrition program for women, infants, and children food packages: the Maryland food preference study. *J Am Diet Assoc.* 2009 Jan;109(1):116-23. doi: 10.1016/j.jada.2008.10.016. PMID: 19103331. -**No data since 2009**
  80. Black MM, Trude ABC, Armstrong B. Prenatal Special Supplemental Nutrition Program for Women, Infants, and Children Participation: A Step Toward Human Capital Development. *JAMA Pediatr.* 2019 Jul 1doi: 10.1001/jamapediatrics.2019.1682. PMID: 31260027. -**No original data**
  81. Blakeney EL, Herting JR, Bekemeier B, et al. Social determinants of health and disparities in prenatal care utilization during the Great Recession period 2005-2010. *BMC Pregnancy Childbirth.* 2019 Oct 29;19(1):390. doi: 10.1186/s12884-019-2486-1. PMID: 31664939. - **Does not provide any outcome of interest**
  82. Blakeney EL. The Great Recession and Health Disparities: A Study of Maternal and Child Health Outcomes in Washington and Florida: University of Washington; 2014. - **Other: Dissertation**
  83. Bombard JM, Kortsmid K, Warner L, et al. Vital signs: Trends and disparities in infant safe sleep practices - United States, 2009-2015. *Morbidity and Mortality Weekly Report.* 2018;67(1):39-46. doi: 10.15585/mmwr.mm6701e1. -**Does not provide any outcome of interest**
  84. Bonuck K, Avraham SB, Lo Y, et al. Bottle-weaning intervention and toddler overweight. *J Pediatr.* 2014 Feb;164(2):306-12.e1-2. doi: 10.1016/j.jpeds.2013.09.029. PMID: 24183206. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  85. Boone KM, Dynia JM, Logan J, et al. Socioeconomic determinants of breastfeeding initiation and continuation for families living in poverty. *Pediatrics.* 2019;144(2)doi: 10.1542/peds.144.2-MeetingAbstract.272. - **Conference/meeting abstract**

86. Borger C, Weinfield NS, Paolicelli C, et al. Prenatal and Postnatal Experiences Predict Breastfeeding Patterns in the WIC Infant and Toddler Feeding Practices Study-2. Breastfeed Med. 2021 Jul 15doi: 10.1089/bfm.2021.0054. PMID: 34265220. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
87. Bower K, Dee D, Sharma A, et al. Differences in receipt of breastfeeding-related maternity care practices among teen mothers and mothers  $\geq 20$  years-- Pregnancy Risk Assessment Monitoring System (PRAMS), 13 states and New York City, 2012-2013. Pediatrics. 2018;142(1)doi: 10.1542/peds.142.1\_MeetingAbstract.677. **- Conference/meeting abstract**
88. Boyd NR, Windsor RA. A formative evaluation in maternal and child health practice: the Partners for Life Nutrition Education Program for pregnant women. Maternal & Child Health Journal. 2003;7(2):137-43. doi: 10.1023/a:1023873112024. PMID: 106869797. **- Does not provide any OUTCOME of interest (Mortality, children development)**
89. Brennan LM, Shelleby EC, Shaw DS, et al. Indirect effects of the Family Check-Up on school-age academic achievement through improvements in parenting in early childhood. Journal of Educational Psychology. 2013;105(3):762-73. doi: 10.1037/a0032096. **-Does not provide any outcome of interest**
90. Briefel RR, Collins AM, Wolf A, et al. Nutrition impacts in a randomized trial of summer food benefits to prevent childhood hunger in U.S. schoolchildren. Journal of Hunger and Environmental Nutrition. 2018;13(3):304-21. doi: 10.1080/19320248.2017.1393366. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
91. Brodsky JL, Viner-Brown S, Handler AS. Changes in maternal cigarette smoking among pregnant WIC participants in Rhode Island. Matern Child Health J. 2009 Nov;13(6):822-31. doi: 10.1007/s10995-008-0415-4. PMID: 18830809. **-No data since 2009**
92. Brodsky JL, Viner-Brown S, Handler AS. Changes in maternal cigarette smoking among pregnant WIC participants in Rhode Island...women, infants, and children. Maternal & Child Health Journal. 2009;13(6):822-31. doi: 10.1007/s10995-008-0415-4. PMID: 105328150. **-No data since 2009**
93. Brown C, Hull P, Selove R, et al. Barriers to eating fruits and vegetables among a low-income ethnically diverse population. Cancer Epidemiology Biomarkers and Prevention. 2020;29(6 SUPPL 1)doi: 10.1158/1538-7755.DISP18-A033. **- Conference/meeting abstract**
94. Brownell E, Howard CR, Lawrence RA, et al. Delayed onset lactogenesis II predicts the cessation of any or exclusive breastfeeding. J Pediatr. 2012 Oct;161(4):608-14. doi: 10.1016/j.jpeds.2012.03.035. PMID: 22575242. **-No data since 2009**

95. Bruening M, McClain D, Moramarco M, et al. The Role of SNAP in Home Food Availability and Dietary Intake among WIC Participants Facing Unstable Housing. *Public Health Nurs.* 2017 May;34(3):219-28. doi: 10.1111/phn.12311. PMID: 28084013. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
96. Brusk JJ, Bensley RJ. A Comparison of Mobile and Fixed Device Access on User Engagement Associated With Women, Infants, and Children (WIC) Online Nutrition Education. *JMIR Res Protoc.* 2016 Nov 15;5(4):e216. doi: 10.2196/resprot.6608. PMID: 27847351. **-Does not provide any outcome of interest**
97. Bryan A, Calvo-Friedman A, McLean M, et al. Addressing food insecurity through a primary care/CBO partnership. *Journal of General Internal Medicine.* 2020;35(SUPPL 1):S628. doi: 10.1007/s11606-020-05890-3. **- Conference/meeting abstract**
98. Buescher PA, Horton SJ, Devaney BL, et al. Differences in use of health services between white and African American children enrolled in Medicaid in North Carolina. *Maternal & Child Health Journal.* 2003;7(1):45-52. doi: 10.1023/a:1022541617877. PMID: 106834049. **- No mention of WIC program**
99. Bugg K, Edwards R, Burnham L, et al. The champs initiative: Integrating communities for reducing breastfeeding disparities. *Journal of Women's Health.* 2017;26(4):A9-A10. doi: 10.1089/jwh.2017.29011.abstracts. **- Conference/meeting abstract**
100. Bullinger LR, Gurley-Calvez T. WIC participation and maternal behavior: Breastfeeding and work leave. *Contemporary Economic Policy.* 2016;34(1):158-72. doi: 10.1111/coep.12123. **-No data since 2009**
101. Burke J. Food system disparities. *FASEB Journal.* 2015;29(1). **- Conference/meeting abstract**
102. Burke NL, Harville EW, Wickliffe JK, et al. Determinants of vitamin D status among Black and White low-income pregnant and non-pregnant reproductive-aged women from Southeast Louisiana. *BMC Pregnancy Childbirth.* 2019 Apr 2;19(1):111. doi: 10.1186/s12884-019-2246-2. PMID: 30940107. **-Does not provide any outcome of interest**
103. Burkhardt MC, Beck AF, Kahn RS, et al. Are our babies hungry? Food insecurity among infants in urban clinics. *Clin Pediatr (Phila).* 2012 Mar;51(3):238-43. doi: 10.1177/0009922811426767. PMID: 22114199. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
104. Buscemi J, Blumstein L, Kong A, et al. Retaining traditionally hard to reach participants: Lessons learned from three childhood obesity studies. *Contemp Clin Trials.* 2015 May;42:98-104. doi: 10.1016/j.cct.2015.03.014. PMID: 25847577. **-Relevant Systematic**

**Review or Dissertation that applies to the question**

105. Bylander J. How COVID-19 threatens the safety net for us children: School closures appear to slow the spread of the virus, but for many children the health ramifications are far broader. *Health Affairs*. 2020;39(10):1668-71. doi: 10.1377/hlthaff.2020.01576. **-No original data**
106. Cahill JM, Freeland-Graves JH, Shah BS, et al. Determinants of weight loss after an intervention in low-income women in early postpartum. *J Am Coll Nutr*. 2012 Apr;31(2):133-43. doi: 10.1080/07315724.2012.10720019. PMID: 22855919. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
107. Campbell LA, Wan J, Speck PM, et al. Women, Infant and Children (WIC) peer counselor contact with first time breastfeeding mothers. *Public Health Nurs*. 2014 Jan-Feb;31(1):3-9. doi: 10.1111/phn.12055. PMID: 24387771. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
108. Campos M, Pomeroy J, Mays MH, et al. Intervention to promote physical activation and improve sleep and response feeding in infants for preventing obesity early in life, the baby-act trial: Rationale and design. *Contemporary Clinical Trials*. 2020;99doi:

10.1016/j.cct.2020.106185. **- Other: Protocol**

109. Canales MK, Coffey N, Moore E. Exploring Health Implications of Disparities Associated with Food Insecurity Among Low-Income Populations. *Nurs Clin North Am*. 2015 Sep;50(3):465-81. doi: 10.1016/j.cnur.2015.05.003. PMID: 26333604. **-No mention of WIC program**
110. Cartagena DC. Factors contributing to infant feeding practices with Latina mothers: Virginia Commonwealth University; 2014. **-Relevant Systematic Review or Dissertation that applies to the question**
111. Chaidez V, Kaiser LL. Validation of an instrument to assess toddler feeding practices of Latino mothers. *Appetite*. 2011 Aug;57(1):229-36. doi: 10.1016/j.appet.2011.05.106. PMID: 21600943. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
112. Chamberlin LA, Sherman SN, Jain A, et al. The challenge of preventing and treating obesity in low-income, preschool children: perceptions of WIC health care professionals. *Arch Pediatr Adolesc Med*. 2002 Jul;156(7):662-8. doi: 10.1001/archpedi.156.7.662. PMID: 12090832. **- Does not provide any OUTCOME of interest (Mortality, children development)**
113. Chambers BD, Baer RJ, Bandoli G, et al. 855: Risk of adverse birth outcome among Black women with post-traumatic stress disorder. *American Journal of Obstetrics and*

- Gynecology. 2020;222(1):S535. doi: 10.1016/j.ajog.2019.11.869. -  
**Conference/meeting abstract**
114. Chang KL, Zastrow M, Zdorovtsov C, et al. Do SNAP and WIC Programs Encourage More Fruit and Vegetable Intake? A Household Survey in the Northern Great Plains. Journal of Family and Economic Issues. 2015;36(4):477-90. doi: 10.1007/s10834-014-9412-5. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  115. Chang MW, Brown R, Nitzke S. Fast Food Intake in Relation to Employment Status, Stress, Depression, and Dietary Behaviors in Low-Income Overweight and Obese Pregnant Women. Matern Child Health J. 2016 Jul;20(7):1506-17. doi: 10.1007/s10995-016-1949-5. PMID: 26973147. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  116. Chang MW, Brown R, Wegener D. Stress mediated the associations between a lifestyle intervention and fat and fast food intakes. Obesity. 2020;28(SUPPL 2):159-60. doi: 10.1002/oby.23063. -  
**Conference/meeting abstract**
  117. Chang MW, Nitzke S, Brown R. Design and outcomes of a Mothers In Motion behavioral intervention pilot study. J Nutr Educ Behav. 2010 May-Jun;42(3 Suppl):S11-21. doi: 10.1016/j.jneb.2010.01.010. PMID: 20399404. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  118. Chang MW, Nitzke S, Brown R. Mothers In Motion intervention effect on psychosocial health in young, low-income women with overweight or obesity. BMC Public Health. 2019 Jan 14;19(1):56. doi: 10.1186/s12889-019-6404-2. PMID: 30642311. **-WIC program material, brochures, training manuals**
  119. Chang MW, Nitzke S, Brown RL, et al. Development and validation of a self-efficacy measure for fat intake behaviors of low-income women. J Nutr Educ Behav. 2003 Nov-Dec;35(6):302-7. doi: 10.1016/s1499-4046(06)60344-8. PMID: 14642215. **-Does not provide any OUTCOME of interest (Mortality, children development)**
  120. Chang MW, Tan A, Schaffir J. Relationships between stress, demographics and dietary intake behaviours among low-income pregnant women with overweight or obesity. Public Health Nutr. 2019 Apr;22(6):1066-74. doi: 10.1017/s1368980018003385. PMID: 30621807. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  121. Chaparro MP, Anderson CE. Differences in Early Childhood Dietary Behaviors by Infant Feeding Type and Sex. J Nutr. 2021 Apr 13doi: 10.1093/jn/nxab076. PMID: 33847341. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

122. Chaparro MP, Langellier BA, Wang MC, et al. Effects of parental nativity and length of stay in the US on fruit and vegetable intake among WIC-enrolled preschool-aged children. *J Immigr Minor Health*. 2015 Apr;17(2):333-8. doi: 10.1007/s10903-014-0097-5. PMID: 25179897. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
123. Charvet A, Huffman FG. Beverage Intake and Its Effect on Body Weight Status among WIC Preschool-Age Children. *J Obes*. 2019;2019:3032457. doi: 10.1155/2019/3032457. PMID: 30800480. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
124. Chatterji P, Brooks-Gunn J. WIC participation, breastfeeding practices, and well-child care among unmarried, low-income mothers. *American Journal of Public Health*. 2004;94(8):1324-7. doi: 10.2105/AJPH.94.8.1324. PMID: 106578083. **- Does not provide any OUTCOME of interest (Mortality, children development)**
125. Chatterji P, Liu X, Yörük BK. The effects of the 2010 Affordable Care Act dependent care provision on family structure and public program participation among young adults. *Review of Economics of the Household*. 2019;17(4):1133-61. doi: 10.1007/s11150-019-09459-w. **-Does not provide any outcome of interest**
126. Chauvenet C, De Marco M, Barnes C, et al. WIC Recipients in the Retail Environment: A Qualitative Study Assessing Customer Experience and Satisfaction. *J Acad Nutr Diet*. 2019 Mar;119(3):416-24.e2. doi: 10.1016/j.jand.2018.09.003. PMID: 30502034. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
127. Chen DY, Gazmararian JA. Impact of personal preference and motivation on fruit and vegetable consumption of WIC-participating mothers and children in Atlanta, GA. *J Nutr Educ Behav*. 2014 Jan;46(1):62-7. doi: 10.1016/j.jneb.2013.03.001. PMID: 24238910. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
128. Chen YH, Ma ZQ, Watkins SM. Effects of Individual and Neighborhood Characteristics on Childhood Blood Lead Testing and Elevated Blood Lead Levels, A Pennsylvania Birth Cohort Analysis. *J Prim Care Community Health*. 2021 Jan-Dec;12:21501327211017780. doi: 10.1177/21501327211017780. PMID: 34009062. **-Does not provide any outcome of interest**
129. Cheng ER, Batista E, Chen L, et al. Correlates of sugar-sweetened beverage intake among low-income women during the first 1000 days. *Public Health Nutrition*. 2021;24(9):2496-501. doi: 10.1017/S1368980020003390. **-Does not contain a comparison group or address the association between**

**WIC participation and an outcome of interest**

130. Cheng ER, Batista E, Chen L, et al. Correlates of sugar-sweetened beverage intake among low-income women during the first 1000 days. *Public Health Nutr.* 2021 Jun;24(9):2496-501. doi: 10.1017/s1368980020003390. PMID: 33087210. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
131. Cheng ER, Nelson CC, Leung-Strle P, et al. Nutrition provider confidence in the Massachusetts Childhood Obesity Research Demonstration (MA-CORD) study. *Prev Med Rep.* 2019 Mar;13:289-92. doi: 10.1016/j.pmedr.2019.01.010. PMID: 30740295. **- Descriptive research on WIC implementation, operations, and program costs**
132. Chiang RJ. Perspectives on infant feeding beliefs, attitudes, and practices of Hispanic mothers enrolled in WIC: Implications for breastfeeding peer counseling: ProQuest Information & Learning; 2018. **-Relevant Systematic Review or Dissertation that applies to the question**
133. Chiasson MA, Findley S, Sekhobo J, et al. Changing WIC changes what children eat. *Obesity.* 2011;19:S48. doi: 10.1038/oby.2011.222. **- Conference/meeting abstract**
134. Chiasson MA, Findley SE, Sekhobo JP, et al. Changing WIC changes what children eat. *Obesity (Silver Spring).* 2013 Jul;21(7):1423-9. doi: 10.1002/oby.20295. PMID:

**23703806. – Other: No adjusted data**

135. Children's Action Alliance PAZ. Measuring School Readiness: How Do We Know When We're on Track? 2003. <http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=eric&AN=ED482862&site=ehost-live&scope=site&authtype=ip,shib&custid=s3555202> **- No original data (opinion, descriptive data, letters, editorial, commentary)**
136. Cho SH, Chang KL, Yeo J, et al. Comparison of fruit and vegetable consumption among Native and non-Native American populations in rural communities. *International Journal of Consumer Studies.* 2015;39(1):67-73. doi: 10.1111/ijcs.12153. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
137. Chorniy A, Currie J, Sonchak L. Does prenatal wic participation improve child outcomes? *American Journal of Health Economics.* 2020;6(2):169-98. doi: 10.1086/707832. **-Relevant Systematic Review or Dissertation that applies to the question**
138. Christaldi J, Pazzaglia G. An Exploration of the Influences Contributing to Food Insecurity in Chester County, Pennsylvania. *Health promotion practice.* 2020;21(3):383-9. doi: 10.1177/1524839918801588. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

139. Cisewski JA, McCann KA. Analysis of demographic differences in intent to breastfeed and sustained breastfeeding in the national children's study. *Pediatrics*. 2018;142(1)doi: 10.1542/peds.142.1\_MeetingAbstract.675. - **Conference/meeting abstract**
140. Clement SK. Increasing breast-feeding continuation rates amongst women, infant, child participants in cut bank, MT via peer counseling. *Journal of Investigative Medicine*. 2019;67(1):230-1. doi: 10.1136/jim-2018-000939.383. - **Conference/meeting abstract**
141. Cobb LK, Anderson CA, Appel L, et al. Baltimore City Stores Increased The Availability Of Healthy Food After WIC Policy Change. *Health Aff (Millwood)*. 2015 Nov;34(11):1849-57. doi: 10.1377/hlthaff.2015.0632. PMID: 26526242. -**Does not provide any outcome of interest**
142. Cohen J, Schwartz MB. Documented Success and Future Potential of the Healthy, Hunger-Free Kids Act. *Journal of the Academy of Nutrition and Dietetics*. 2020;120(3):359-62. doi: 10.1016/j.jand.2019.10.021. -**No original data**
143. Colchamiro R, Edwards RA, Nordstrom C, et al. Mobilizing Community Resources to Enhance Postdischarge Support for Breastfeeding in Massachusetts (USA): Results of a Catalyst Grant Approach. *J Hum Lact*. 2015 Nov;31(4):631-40. doi: 10.1177/0890334415597680. PMID: 26266946. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
144. Colchamiro R, Ghiringhelli K, Hause J. Touching Hearts, Touching Minds: using emotion-based messaging to promote healthful behavior in the Massachusetts WIC program. *J Nutr Educ Behav*. 2010 May-Jun;42(3 Suppl):S59-65. doi: 10.1016/j.jneb.2010.02.004. PMID: 20399411. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
145. Cole CR, Grant FK, Swaby-Ellis ED, et al. Zinc and iron deficiency and their interrelations in low-income African American and Hispanic children in Atlanta. *Am J Clin Nutr*. 2010 Apr;91(4):1027-34. doi: 10.3945/ajcn.2009.28089. PMID: 20147474. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
146. Coleman-Jensen A, Rabbitt MP, Gregory C, et al. Household food security in the United States in 2014. *U.S. Household Food Security: Statistics and Analysis for 2014*. Nova Science Publishers, Inc.; 2016:1-56. -**Relevant Systematic Review or Dissertation that applies to the question**
147. Collins BN, Lepore SJ. Babies Living Safe & Smokefree: randomized controlled trial of a multilevel multimodal behavioral intervention to reduce low-income children's tobacco smoke exposure. *BMC Public Health*. 2017 Mar 14;17(1):249. doi: 10.1186/s12889-



- 017-4145-7. PMID: 28288601. **-No original data**
148. Colson ER, Levenson S, Rybin D, et al. Barriers to following the supine sleep recommendation among mothers at four centers for the Women, Infants, and Children Program. *Pediatrics*. 2006 Aug;118(2):e243-50. doi: 10.1542/peds.2005-2517. PMID: 16882769. **- Does not provide any OUTCOME of interest (Mortality, children development)**
  149. Committee to Review WICFP, Food, Nutrition B, et al. In: Rasmussen KM, Latulippe ME, Yaktine AL, eds. Review of WIC Food Packages: An Evaluation of White Potatoes in the Cash Value Voucher: Letter Report. Washington (DC): National Academies Press (US) Copyright 2015 by the National Academy of Sciences. All rights reserved.; 2015. **-No original data**
  150. Conrad Z, Johnson LK, Juan W, et al. Nutrient inadequacy among nutritionally vulnerable populations in the US. *FASEB Journal*. 2017;31(1). **- Conference/meeting abstract**
  151. Conrad Z, Johnson LK, Roemmich JN, et al. Time Trends and Patterns of Reported Egg Consumption in the U.S. by Sociodemographic Characteristics. *Nutrients*. 2017 Mar 28;9(4)doi: 10.3390/nu9040333. PMID: 28350345. **-No mention of WIC program**
  152. Cordeiro LS, Sibeko L, Nelson-Peterman J. Healthful, Cultural Foods and Safety Net Use Among Cambodian and Brazilian Immigrant Communities in Massachusetts. *J Immigr Minor Health*. 2018 Aug;20(4):991-9. doi: 10.1007/s10903-017-0607-3. PMID: 28608262. **-No mention of WIC program**
  153. Cox SM. Prenatal care experience and infant health outcomes among low-income women in eight states, 1996-2003: ProQuest Information & Learning; 2010. **-No data since 2009**
  154. Crespi CM, Gao S, Payne A, et al. Longitudinal trajectories of adiposity-related measures from age 2-5 years in a population of low-income Hispanic children. *Pediatr Res*. 2020 Aug 4doi: 10.1038/s41390-020-1099-8. PMID: 32750702. **-No mention of WIC program**
  155. Crespo-Bellido M, Grutzmacher S, Smit E. Food security and alternative food acquisition among US low-income households: results from the National Food Acquisition and Purchasing Survey (FoodAPS). *Public health nutrition*. 2021;24(5):787-95. doi: 10.1017/S1368980020003791. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  156. Cricco-Lizza R. Infant-feeding beliefs and experiences of black women enrolled in WIC in the New York metropolitan area. *Qualitative Health Research*. 2004;14(9):1197-210. doi: 10.1177/1049732304268819. **- Does not provide any OUTCOME of interest (Mortality, children development)**
  157. Cricco-Lizza R. The milk of human kindness: Environmental and human interactions in a WIC clinic that

- influence infant-feeding decisions of black women. *Qualitative Health Research*. 2005;15(4):525-38. doi: 10.1177/1049732304273030. - **Does not provide any OUTCOME of interest (Mortality, children development)**
158. Cross-Barnet C, Augustyn M, Gross S, et al. Long-term breastfeeding support: failing mothers in need. *Matern Child Health J*. 2012 Dec;16(9):1926-32. doi: 10.1007/s10995-011-0939-x. PMID: 22246714. -**Is Qualitative study but does not linked to an outcome of interest**
  159. Cueva K, Shimer S, Kent D, et al. Strengths and Challenges of the Alaska WIC Breastfeeding Peer Counselor Program: A Qualitative Study of Program Implementation. *J Nutr Educ Behav*. 2017 Nov-Dec;49(10):858-66.e1. doi: 10.1016/j.jneb.2017.07.007. PMID: 28917491. -**Does not provide any outcome of interest**
  160. Currie J, Rajani I. Within-Mother Estimates of the Effects of WIC on Birth Outcomes in New York City. *Econ Inq*. 2015 Oct;53(4):1691-701. doi: 10.1111/ecin.12219. PMID: 28503006. -**No data since 2009**
  161. Currie J, Rossin-Slater M. Does the WIC program promote equality of opportunity in early life? In: Tach L, Dunifon R, Miller DL, eds. *Confronting inequality: How policies and practices shape children's opportunities*. Washington, DC: American Psychological Association; 2020:49-66. -**No original data**
  162. Danaher C, Fredericks D, Bryson SW, et al. Early childhood feeding practices improved after short-term pilot intervention with pediatricians and parents. *Childhood Obesity*. 2011;7(6):480-7. doi: 10.1089/chi.2011.0056. -**No data since 2009**
  163. Dancel L, Perrin EM, Yin HS, et al. Acculturation and infant feeding styles in a latino population: Results from an ongoing randomized controlled trial of obesity prevention. *Gastroenterology*. 2013;144(5):S397. - **Conference/meeting abstract**
  164. Darfour-Oduro SA, Kim J. WIC mothers' social environment and postpartum health on breastfeeding initiation and duration. *Breastfeed Med*. 2014 Dec;9(10):524-9. doi: 10.1089/bfm.2014.0067. PMID: 25188784. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  165. Davis CF, Lazariu V, Sekhobo JP. Smoking cessation in the WIC program. *Matern Child Health J*. 2010 May;14(3):474-7, discussion 8-84. doi: 10.1007/s10995-010-0572-0. PMID: 20155308. -**No original data**
  166. Davis J, Jossefides M, Lane T, et al. A Spatial Evaluation of Healthy Food Access: Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Participants. *J Public Health Manag Pract*. 2019 Sep/Oct;25 Suppl 5, Tribal Epidemiology Centers: Advancing Public Health in Indian Country for Over 20 Years:S91-s6. doi: 10.1097/phh.0000000000001013. PMID: 31348195. -**Does not provide any outcome of interest**

167. Davis JN, Whaley SE, Goran MI. Effects of breastfeeding and low sugar-sweetened beverage intake on obesity prevalence in Hispanic toddlers. *Am J Clin Nutr.* 2012 Jan;95(1):3-8. doi: 10.3945/ajcn.111.019372. PMID: 22170357. **-No data since 2009**
168. Davison KK, Edmunds LS, Wyker BA, et al. Feasibility of increasing childhood outdoor play and decreasing television viewing through a family-based intervention in WIC, New York State, 2007-2008. *Prev Chronic Dis.* 2011 May;8(3):A54. PMID: 21477494. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
169. Davison KK, Falbe J, Taveras EM, et al. Evaluation overview for the Massachusetts Childhood Obesity Research Demonstration (MA-CORD) project. *Child Obes.* 2015 Feb;11(1):23-36. doi: 10.1089/chi.2014.0059. PMID: 25575095. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
170. Davy BM, Zoellner JM, Waters CN, et al. Associations among chronic disease status, participation in federal nutrition programs, food insecurity, and sugar-sweetened beverage and water intake among residents of a health-disparate region. *J Nutr Educ Behav.* 2015 May-Jun;47(3):196-205. doi: 10.1016/j.jneb.2015.01.001. PMID: 25676604. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
171. Daye EC. Correlations between childhood obesity and obesogenic environmental variables within Durham county, North Carolina: ProQuest Information & Learning; 2016. **-Relevant Systematic Review or Dissertation that applies to the question**
172. Dayeon S, Kyung Won L, Song WO. Pre-Pregnancy Weight Status Is Associated with Diet Quality and Nutritional Biomarkers during Pregnancy. *Nutrients.* 2016;8(3):162. doi: 10.3390/nu8030162. PMID: 114117897. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
173. Dean A, Markowitz G, Sullivan C, et al. To eat or not to eat: Is food insecurity prevalent in households with children experiencing feeding difficulties? *Journal of Pediatric Gastroenterology and Nutrition.* 2019;69doi: 10.1097/MPG.0000000000002518. **- Conference/meeting abstract - Conference/meeting abstract**
174. DeChristopher LR, Tucker KL. Excess free fructose, high-fructose corn syrup and adult asthma: the Framingham Offspring Cohort. *Br J Nutr.* 2018 May;119(10):1157-67. doi: 10.1017/s0007114518000417. PMID: 29587887. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

175. DeMattei RR, Vangennip A. Assessing Oral Health Knowledge, Opinions, and Behaviors of WIC Recipients in Rural Southern Illinois. ICAN: Infant, Child, & Adolescent Nutrition. 2011;3(4):240-3. doi: 10.1177/1941406411415848. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
176. Demirci JR, Sereika SM, Bogen D. Prevalence and predictors of early breastfeeding among late preterm mother-infant dyads. Breastfeed Med. 2013 Jun;8(3):277-85. doi: 10.1089/bfm.2012.0075. PMID: 23199304. **-No data since 2009**
177. Derige DN. Breastfeeding among US Latinas: Subgroup analysis of the National Immunization Survey: ProQuest Information & Learning; 2017. **-Relevant Systematic Review or Dissertation that applies to the question**
178. Di Noia J, Cullen KW, Monica D. Social Desirability Trait Is Associated with Self-Reported Vegetable Intake among Women Enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children. J Acad Nutr Diet. 2016 Dec;116(12):1942-50. doi: 10.1016/j.jand.2016.07.008. PMID: 27665255. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
179. Di Noia J, Monica D, Cullen KW, et al. Differences in Fruit and Vegetable Intake by Race/Ethnicity and by Hispanic Origin and Nativity Among Women in the Special Supplemental Nutrition Program for Women, Infants, and Children, 2015. Prev Chronic Dis. 2016 Aug 25;13:E115. doi: 10.5888/pcd13.160130. PMID: 27560723. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
180. Di Noia J, Monica D, Cullen KW, et al. Perceived Influences on Farmers' Market Use among Urban, WIC-enrolled Women. Am J Health Behav. 2017 Sep 1;41(5):618-29. doi: 10.5993/ajhb.41.5.11. PMID: 28760184. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
181. Di Noia J, Monica D, Gray HL, et al. The Special Supplemental Nutrition Program for Women, Infants, and Children Fresh Start Randomized Controlled Trial: Baseline Participant Characteristics and Reliability of Measures. J Acad Nutr Diet. 2016 Dec;116(12):1899-913. doi: 10.1016/j.jand.2016.07.020. PMID: 27663256. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
182. Di Noia J, Monica D, Jensen H, et al. Economic Evaluation of a Farm-to-Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Intervention Promoting Vegetable Consumption. Public Health Nutr. 2021 May 11:1-20. doi: 10.1017/s1368980021001981. PMID: 33972002. **-Does not contain a**

**comparison group or address the association between WIC participation and an outcome of interest**

183. Di Noia J, Monica D, Jensen HH, et al. Economic evaluation of a farm-to-Special Supplemental Nutrition Programme for Women, Infants and Children intervention promoting vegetable consumption. Public Health Nutr. 2021 Aug;24(12):3922-8. doi: 10.1017/s1368980021001981. PMID: 33972002. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
184. Di Noia J, Monica D, Sikorskii A, et al. Feasibility of a farm-to-WIC intervention. Public Health Nutr. 2019 Dec;22(18):3405-15. doi: 10.1017/s1368980019001976. PMID: 31405392. **- Conference/meeting abstract**
185. Di Noia J, Monica D, Sikorskii A, et al. Outcomes of a randomized controlled trial of nutrition education to promote farmers' market fruit and vegetable purchases and consumption among women enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). BMC Nutr. 2017;3:48. doi: 10.1186/s40795-017-0172-0. PMID: 32153828. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
186. Di Noia J, Monica D, Sikorskii A. Process Evaluation of a Farm-to-WIC Intervention. J Acad Nutr Diet. 2021 Jun 15doi: 10.1016/j.jand.2021.05.014. PMID:

34144918. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

187. Dishion TJ, Brennan LM, Shaw DS, et al. Prevention of problem behavior through annual family check-ups in early childhood: intervention effects from home to early elementary school. J Abnorm Child Psychol. 2014;42(3):343-54. doi: 10.1007/s10802-013-9768-2. PMID: 24022677. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
188. Dishion TJ, Mun CJ, Drake EC, et al. A transactional approach to preventing early childhood neglect: The Family Check-Up as a public health strategy. Dev Psychopathol. 2015 Nov;27(4 Pt 2):1647-60. doi: 10.1017/s0954579415001005. PMID: 26535950. **-Does not provide any outcome of interest**
189. Dodgson JE, Codier E, Kaiwi P, et al. Breastfeeding patterns in a community of Native Hawaiian mothers participating in WIC...Special Supplemental Nutrition Program for Women, Infants, and Children. Family & Community Health. 2007;30:S46-58. doi: 10.1097/01.fch.0000264880.96310.9a . PMID: 106114503. **- Does not provide any OUTCOME of interest (Mortality, children development)**
190. Dollahite JS, Pijai EI, Scott-Pierce M, et al. A Randomized Controlled Trial of a Community-Based Nutrition Education Program for Low-Income Parents. Journal of

- Nutrition Education & Behavior. 2014;46(2):102-9. doi: 10.1016/j.jneb.2013.09.004. PMID: 107895237. **-No mention of WIC program**
191. Dove MS, Stewart SL, Cummins SE, et al. Medi-Cal Incentives to Quit Smoking Program: Reach to Pregnant and Parenting Women. *Am J Prev Med*. 2018 Dec;55(6 Suppl 2):S205-s13. doi: 10.1016/j.amepre.2018.07.016. PMID: 30454675. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
192. Downey J, Greder K. Depressive symptomology among rural low-income latina and non-latina white mothers. Emerald Group Publishing Ltd.; 2014. (vol. 8B). **-No original data**
193. Drennen CR, Coleman SM, De Cuba SE, et al. Food insecurity, health, and development in children under age four years. *Pediatrics*. 2019;144(4)doi: 10.1542/peds.2019-0824. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
194. Driscoll AK, Osterman MJK. Maternal Characteristics of Prenatal WIC Receipt in the United States, 2016. *NCHS Data Brief*. 2018 Jan(298):1-8. PMID: 29442995. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
195. Duffy E, Taillie LS, Richter AP, et al. Exploring perceptions of toddler milk among latino and non-latino parents. *Obesity*. 2020;28(SUPPL 2):19. doi: 10.1002/oby.23057. **-Conference/meeting abstract**
196. Dumont DM, Allen SA, Rich JD. Sesame Street goes to jail: Physicians should follow. *Annals of Internal Medicine*. 2014;161(7):522-3. doi: 10.7326/M14-0080. **-No original data**
197. Dumont DM, Wildeman C, Lee H, et al. Incarceration, maternal hardship, and perinatal health behaviors. *Matern Child Health J*. 2014 Nov;18(9):2179-87. doi: 10.1007/s10995-014-1466-3. PMID: 24615355. **-Does not provide any outcome of interest**
198. Dunaway LEF, Bazzano AN, Gray SAO, et al. Health, Neighborhoods, and School Readiness from the Parent Perspective: A Qualitative Study of Contextual and Socio-Emotional Factors. *Int J Environ Res Public Health*. 2021 Sep 4;18(17)doi: 10.3390/ijerph18179350. PMID: 34501939. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
199. Dunlop AL, Dretler AW, Badal HJ, et al. Acceptability and potential impact of brief preconception health risk assessment and counseling in the WIC Setting. *Am J Health Promot*. 2013 Jan-Feb;27(3 Suppl):S58-65. doi: 10.4278/ajhp.120109-QUAL-7. PMID: 23286665. **-Does not contain a comparison group or address the association between WIC**

**participation and an outcome of interest**

200. Dunn R, Kalich K. Barriers and contributors to breastfeeding and early infant feeding practices in new hampshire WIC mothers. Breastfeeding Medicine. 2013;8:S-13. doi: 10.1089/bfm.2013.9982.
201. Dunn RL, Kalich KA, Fedrizzi R, et al. Barriers and Contributors to Breastfeeding in WIC Mothers: A Social Ecological Perspective. Breastfeed Med. 2015 Dec;10(10):493-501. doi: 10.1089/bfm.2015.0084. PMID: 26565749. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
202. Dychtwald D. The POPP project: A qualitative study leading to the development of an intervention to promote ongoing paternal participation in the women, infants, and children's nutrition program: ProQuest Information & Learning; 2021. **-Does not provide any outcome of interest**
203. Dychtwald DK, Kaimal G, Kilby LM, et al. "When a Father feels Excluded": A Qualitative Study Exploring the Role of Fathers in the Women, Infants, and Children (WIC) Supplemental Nutrition Program. Int J Qual Stud Health Well-being. 2021 Dec;16(1):1932026. doi: 10.1080/17482631.2021.1932026. PMID: 34155962. **-Is Qualitative study but does not linked to an outcome of interest**
204. Eapen DJ. A qualitative description of pregnancy related social support experiences of low income mothers with low birth weight babies: ProQuest Information & Learning; 2017. **-Relevant Systematic Review or Dissertation that applies to the question**
205. Earnesty D, Mphwanthe G, Rau K, et al. A Qualitative Study: Perceived Barriers and Facilitators to Nutrition Standard Adherence by In-home Childcare Providers. J Acad Nutr Diet. 2021 Aug 17doi: 10.1016/j.jand.2021.08.104. PMID: 34411786. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
206. Edmunds LS, Lee FF, Eldridge JD, et al. Outcome Evaluation of the You Can Do It Initiative to Promote Exclusive Breastfeeding Among Women Enrolled in the New York State WIC Program by Race/Ethnicity. J Nutr Educ Behav. 2017 Jul-Aug;49(7 Suppl 2):S162-S8.e1. doi: 10.1016/j.jneb.2017.05.350. PMID: 28689553. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
207. Edmunds LS. Prenatal participation in WIC: Impact on breastfeeding initiation and duration and on infant weight gain: ProQuest Information & Learning; 2013. **-Relevant Systematic Review or Dissertation that applies to the question**
208. Eicher-Miller HA, Fialkowski MK. Nutrition among vulnerable U.S. populations. Nutrients. 2020;12(10):1-5. doi:

- 10.3390/nu12103150. **-No original data**
209. Elbel E, Milne K, Quirk N, et al. Childhood obesity risk factors during the first 1,000 days in an urban women, infants, and children (wic) program. *Journal of Pediatric Gastroenterology and Nutrition*. 2017;65:S189-S90. doi: 10.1097/MPG.0000000000001805. - **Conference/meeting abstract**
210. Eldridge JD, Hartnett JO, Lee FF, et al. Implementing a WIC-Based Intervention to Promote Exclusive Breastfeeding: Challenges, Facilitators, and Adaptive Strategies. *J Nutr Educ Behav*. 2017 Jul-Aug;49(7 Suppl 2):S177-S85.e1. doi: 10.1016/j.jneb.2017.04.005. PMID: 28689555. **-Is Qualitative study but does not linked to an outcome of interest**
211. Emerson JS, Towns DR, Jones JL, et al. Racial/ethnic and Weight Status Differences in Food Preparation among WIC Participants. *J Health Care Poor Underserved*. 2015 May;26(2):335-44. doi: 10.1353/hpu.2015.0044. PMID: 25913333. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
212. Erley CL. Families in motion: An intervention to reduce children's screen time and promote physical activity through a WIC clinic-based educational program in Montpelier, Idaho. *Journal of Investigative Medicine*. 2015;63(1):111. doi: 10.1097/JIM.0000000000000133. - **Conference/meeting abstract**
213. Escorbore C. Risk factors of infant mortality disparity in Indian River County, Florida: ProQuest Information & Learning; 2021. - **Relevant Systematic Review or Dissertation that applies to the question**
214. Ettienne-Gittens R, McKyer EL, Odum M, et al. Rural versus urban Texas WIC participants' fruit and vegetable consumption. *Am J Health Behav*. 2013 Jan;37(1):130-40. doi: 10.5993/ajhb.37.1.15. PMID: 22943110. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
215. Evans A, Seth JG, Smith S, et al. Parental feeding practices and concerns related to child underweight, picky eating, and using food to calm differ according to ethnicity/race, acculturation, and income. *Matern Child Health J*. 2011 Oct;15(7):899-909. doi: 10.1007/s10995-009-0526-6. PMID: 19771501. **-No data since 2009**
216. Evans K, Labbok M, Abrahams SW. WIC and breastfeeding support services: does the mix of services offered vary with race and ethnicity? *Breastfeed Med*. 2011 Dec;6(6):401-6. doi: 10.1089/bfm.2010.0086. PMID: 21453123. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
217. Evans SH, Clarke P, Koprowski C. Information design to promote better nutrition among pantry clients: four methods of formative evaluation. *Public Health Nutr*. 2010



- Mar;13(3):430-7. doi: 10.1017/s1368980009990851. PMID: 19706220. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
218. Faed P, Stookey J, Batech M, et al. Predictors of Non-Utilization of the Supplemental Nutrition Program for Women, Infants, and Children (WIC) in San Francisco, CA 2008-2011. Californian Journal of Health Promotion. 2014;12(2):32-41. doi: 10.32398/cjhp.v12i2.2148. PMID: 142192878. **-Does not provide any outcome of interest**
219. Fahrenwald NL, Walker SN. Application of the Transtheoretical Model of behavior change to the physical activity behavior of WIC mothers. Public Health Nurs. 2003 Jul-Aug;20(4):307-17. doi: 10.1046/j.1525-1446.2003.20408.x. PMID: 12823791. **- Does not provide any OUTCOME of interest (Mortality, children development)**
220. Farabi N, Song S, Crockett ET, et al. High prevalence of asthma and its determinants among Hispanic/Latino children enrolled in Michigan Migrant and Seasonal Head Start programs. FASEB Journal. 2017;31(1). **- Conference/meeting abstract**
221. Farley TA, Dowell D. Preventing childhood obesity: what are we doing right? Am J Public Health. 2014 Sep;104(9):1579-83. doi: 10.2105/ajph.2014.302015. PMID: 25033123. **-No original data**
222. Farr SL, Denk CE, Dahms EW, et al. Evaluating universal education and screening for postpartum depression using population-based data. J Womens Health (Larchmt). 2014 Aug;23(8):657-63. doi: 10.1089/jwh.2013.4586. PMID: 25072299. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
223. Feldman JS, Wilson MN, Shaw DS. Relations between Early Childhood Paternal Depression and Preschool- and School-age Psychosocial Functioning. J Clin Child Adolesc Psychol. 2020 Feb 20:1-15. doi: 10.1080/15374416.2020.1723600. PMID: 32078383. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
224. Feldman JS, Zhou Y, Krug CW, et al. Indirect effects of the Family Check-Up on youth extracurricular involvement at school-age through improvements in maternal positive behavior support in early childhood. Social Development. 2020doi: 10.1111/sode.12474. **-No data since 2009**
225. Feldman-Winter L, Burnham L, Grossman X, et al. Weight gain in the first week of life predicts overweight at 2 years: A prospective cohort study. Matern Child Nutr. 2018 Jan;14(1)doi: 10.1111/mcn.12472. PMID: 28636245. **- Other: No adjusted data**
226. Ferguson BA, Downey JL, Shriver AE, et al. Improving Early Childhood Development among Vulnerable Populations: A Pilot Initiative at a Women, Infants, and Children Clinic.

- Child Development Research. 2018;2018doi: 10.1155/2018/3943157. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
227. Fernández CR, Chen L, Cheng ER, et al. Food Insecurity and Sugar-Sweetened Beverage Consumption Among WIC-Enrolled Families in the First 1,000 Days. J Nutr Educ Behav. 2020 Aug;52(8):796-800. doi: 10.1016/j.jneb.2020.03.006. PMID: 32444189. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
228. Fernández CR, Licursi M, Wolf R, et al. Food insecurity is a common problem affecting dietary quality in a clinic-based pediatric sickle cell disease sample. Blood. 2020;136(SUPPL 1):8-9. doi: 10.1182/blood-2020-143096. **-Conference/meeting abstract**
229. Figlio DN, Hamersma S, Roth J. Information Shocks and the Take-Up of Social Programs. Journal of Policy Analysis and Management. 2015;34(4):781-804. doi: 10.1002/pam.21855. **-No data since 2009**
230. Fincher D, VanderEnde K, Colbert K, et al. Effect of face-to-face interview versus computer-assisted self-interview on disclosure of intimate partner violence among African American women in WIC clinics. J Interpers Violence. 2015 Mar;30(5):818-38. doi: 10.1177/0886260514536280. PMID: 24923890. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
231. Finkel MA, Troller-Renfree SV, Noble KG. Higher Utilization of Social Services Is Associated with Higher Language Scores in Children from Deeply Impoverished Urban Families. Int J Environ Res Public Health. 2020 Nov 19;17(22)doi: 10.3390/ijerph17228607. PMID: 33228170. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
232. Fischer TP, Olson BH. A qualitative study to understand cultural factors affecting a mother's decision to breast or formula feed. J Hum Lact. 2014 May;30(2):209-16. doi: 10.1177/0890334413508338. PMID: 24186645. **-Is Qualitative study but does not linked to an outcome of interest**
233. Fisher JO, Serrano EL, Foster GD, et al. Title: efficacy of a food parenting intervention for mothers with low income to reduce preschooler's solid fat and added sugar intakes: a randomized controlled trial. Int J Behav Nutr Phys Act. 2019 Jan 17;16(1):6. doi: 10.1186/s12966-018-0764-3. PMID: 30654818. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
234. Fleurant E, Schoeny M, Hoban R, et al. Barriers to Human Milk Feeding at Discharge of Very-Low-Birth-Weight Infants: Maternal Goal Setting as a Key Social Factor. Breastfeed Med.

- 2017 Jan/Feb;12(1):20-7. doi: 10.1089/bfm.2016.0105. PMID: 27906557. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
235. Ford JL, Browning CR, Boch SJ, et al. Racial and Economic Adversity Differences in Stress Markers and Immune Function Among Urban Adolescents. *Nursing research*. 2021;70(5S Suppl 1):S31-S42. doi: 10.1097/NNR.0000000000000527. - **No mention of WIC program**
236. Fortin K, Harvey S, Swearingen White S. Hidden Hunger: Understanding the Complexity of Food Insecurity Among College Students. *J Am Coll Nutr*. 2021 Mar-Apr;40(3):242-52. doi: 10.1080/07315724.2020.1754304. PMID: 33048013. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
237. Foster EM, Jiang M, Gibson-Davis CM. The effect of the WIC program on the health of newborns. *Health Serv Res*. 2010 Aug;45(4):1083-104. doi: 10.1111/j.1475-6773.2010.01115.x. PMID: 20459450. **-No data since 2009**
238. Franklin PD. Exclusive Breastfeeding Duration in Relationship to Infant Risk for Overweight and Obesity at Three Years of Age: George Mason University; 2013. **-Relevant Systematic Review or Dissertation that applies to the question**
239. French SA, Sherwood NE, Veblen-Mortenson S, et al. Multicomponent Obesity Prevention Intervention in Low-Income Preschoolers: Primary and Subgroup Analyses of the NET-Works Randomized Clinical Trial, 2012–2017. *American Journal of Public Health*. 2018;108(12):1695-706. doi: 10.2105/AJPH.2018.304696. PMID: 134666801. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
240. Freudenberg N. Healthy-food procurement: using the public plate to reduce food insecurity and diet-related diseases. *Lancet Diabetes Endocrinol*. 2016 May;4(5):383-4. doi: 10.1016/s2213-8587(16)00078-4. PMID: 27055950. **-No original data**
241. Freudenthal JJ, Bowen DM. Motivational interviewing to decrease parental risk-related behaviors for early childhood caries. *J Dent Hyg*. 2010 Winter;84(1):29-34. PMID: 20040148. **-Does not provide any outcome of interest**
242. Frick KD, Pugh LC, Milligan RA. Costs related to promoting breastfeeding among urban low-income women. *J Obstet Gynecol Neonatal Nurs*. 2012 Jan-Feb;41(1):144-50. doi: 10.1111/j.1552-6909.2011.01316.x. PMID: 22151148. **-Does not provide any outcome of interest**
243. Frisvold D, Leslie E, Price JP. DO TARGETED VOUCHERS INSTILL HABITS? EVIDENCE FROM WOMEN, INFANTS, AND CHILDREN. *Contemporary Economic Policy*. 2020;38(1):67-80.

- doi: 10.1111/coep.12423. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
244. Fuller K. Relationship between presence or absence of the breastfeeding peer counselor program and breastfeeding initiation and exclusive duration rates of WIC clinics in New Mexico: ProQuest Information & Learning; 2014. - **Relevant Systematic Review or Dissertation that applies to the question**
245. Fung EB, Ritchie LD, Walker BH, et al. Randomized, controlled trial to examine the impact of providing yogurt to women enrolled in WIC. *J Nutr Educ Behav*. 2010 May-Jun;42(3 Suppl):S22-9. doi: 10.1016/j.jneb.2010.02.009. PMID: 20399406. **-Does not provide any outcome of interest**
246. Furman L. Should We Pay Mothers Who Receive WIC to Breastfeed? *Pediatrics*. 2017 Mar;139(3)doi: 10.1542/peds.2016-3828. PMID: 28167513. **-No original data**
247. Ga Y, Feng L. Effects of federal nutrition program on birth outcomes. *Atlantic Economic Journal*. 2012;40(1):61-83. doi: 10.1007/s11293-011-9294-y. **-No data since 2009**
248. Gailey S, Cross RI, Messer LC, et al. Characteristics associated with downward residential mobility among birthing persons in California. *Soc Sci Med*. 2021 Jun;279:113962. doi: 10.1016/j.socscimed.2021.113962. PMID: 34020159. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
249. Gallo S, Kogan K, Kitsantas P. Racial and Ethnic Differences in Reasons for Breastfeeding Cessation Among Women Participating in the Special Supplemental Nutrition Program for Women, Infants, and Children. *J Midwifery Womens Health*. 2019 Nov;64(6):725-33. doi: 10.1111/jmwh.13031. PMID: 31469235. **-No data since 2009**
250. Gamble A, Saulters MM, Cranston KL, et al. Recruitment, Retention, and Engagement Strategies for Exercise Interventions With Rural Antenatal Adolescents: Qualitative Interviews With WIC Providers. *J Public Health Manag Pract*. 2020 Sep/Oct;26(5):497-502. doi: 10.1097/phh.0000000000001027. PMID: 32732725. **-Does not provide any outcome of interest**
251. Ganter C, Chuang E, Aftosmes-Tobio A, et al. Community stakeholders' perceptions of barriers to childhood obesity prevention in low-income families, Massachusetts 2012-2013. *Prev Chronic Dis*. 2015 Mar 26;12:E42. doi: 10.5888/pcd12.140371. PMID: 25811497. **-Does not provide any outcome of interest**
252. Garg A, Toy S, Tripodis Y, et al. Influence of maternal depression on household food insecurity for low-income families. *Acad Pediatr*. 2015 May-Jun;15(3):305-10. doi: 10.1016/j.acap.2014.10.002. PMID: 25454368. **-No data since 2009**

253. Gehre C, Chuang E, Blaine RE, et al. Barriers to engage parents in child obesity prevention and control: A multiple stakeholder analysis using the Family Ecological Model. FASEB Journal. 2013;27. - **Conference/meeting abstract**
254. Gerstein DE, Martin AC, Crocker N, et al. Using learner-centered education to improve fruit and vegetable intake in California WIC participants. J Nutr Educ Behav. 2010 Jul-Aug;42(4):216-24. doi: 10.1016/j.jneb.2009.03.125. PMID: 20382089. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
255. Gewa C, Pawloski L, Kaniyanthra A, et al. Using family-based experiential learning to improve nutrition knowledge, dietary intake, physical activity, and food purchasing behaviors among Latina WIC participants and their children: A pilot study. FASEB Journal. 2014;28(1). - **Conference/meeting abstract**
256. Gibbins KJ, Varner MW, Silver RM. State-wide characterization of fetal death between 16 0/7 and 19 6/7 weeks. American Journal of Obstetrics and Gynecology. 2018;218(1):S48. - **Conference/meeting abstract**
257. Gibby CLK, Palacios C, Campos M, et al. Associations between gestational weight gain and rate of infancy weight gain in Hawai'i and Puerto Rico WIC participants. BMC Obes. 2018;5:41. doi: 10.1186/s40608-018-0219-z. PMID: 30524746. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
258. Gibby CLK, Palacios C, Campos M, et al. Associations between gestational weight gain and rate of infancy weight gain in Hawai'i and Puerto Rico WIC participants 11 Medical and Health Sciences 1117 Public Health and Health Services. BMC Obesity. 2018;5(1)doi: 10.1186/s40608-018-0219-z. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
259. Gibby CLK, Palacios C, Campos M, et al. Breastfeeding Discontinuation Not Associated with Maternal Pregravid BMI But Associated with Native Hawaiian or Other Pacific Islander Race in Hawaii and Puerto Rico WIC Participants. Matern Child Health J. 2019 Jan;23(1):19-29. doi: 10.1007/s10995-018-2587-x. PMID: 30006729. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
260. Gilbert D, Nanda J, Paige D. Securing the safety net: concurrent participation in income eligible assistance programs. Matern Child Health J. 2014 Apr;18(3):604-12. doi: 10.1007/s10995-013-1281-2. PMID: 23771236. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

261. Gilmore LA, Klempel MC, Martin CK, et al. Personalized Mobile Health Intervention for Health and Weight Loss in Postpartum Women Receiving Women, Infants, and Children Benefit: A Randomized Controlled Pilot Study. *J Womens Health (Larchmt)*. 2017 Jul;26(7):719-27. doi: 10.1089/jwh.2016.5947. PMID: 28338403. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
262. Giron K, Noe S, Saiki L, et al. Implementation of Postpartum Depression Screening for Women Participating in the WIC Program. *J Am Psychiatr Nurses Assoc*. 2021 Sep 28;10783903211047889. doi: 10.1177/10783903211047889. PMID: 34581225. **-Does not provide any outcome of interest**
263. Gleeson S, Walker C. Immunizations and the WIC program. Combining services benefits children, parents, healthcare system. *Med Econ*. 2011 Dec 10;88(23):65-6, 73-4. PMID: 22250502. **-No original data**
264. Gleeson S. Immunizations and the WIC program. *Contemporary Pediatrics*. 2012;29(2):48-50. **-No original data**
265. Godbout JM, Goldsberry WN, Franklin TE. Factors Associated with Infant Feeding Choices in the Adolescent Population. *J Hum Lact*. 2016 Nov;32(4):642-7. doi: 10.1177/0890334416662629. PMID: 27550378. **-Does not contain a comparison group or address the association between**
- WIC participation and an outcome of interest**
266. Gold J, Tomar SL. Interdisciplinary Community-Based Oral Health Program for Women and Children at WIC. *Matern Child Health J*. 2018 Nov;22(11):1617-23. doi: 10.1007/s10995-018-2557-3. PMID: 29936657. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
267. Gonzalez-Nahm S, Østbye T, Hoyo C, et al. Association between food security, diet quality, and dietary intake during pregnancy in a predominantly African American group of women from North Carolina. *J Acad Nutr Diet*. 2021 Sep 1doi: 10.1016/j.jand.2021.08.110. PMID: 34481120. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
268. Gordon AR, Briefel RR, Collins AM, et al. Delivering Summer Electronic Benefit Transfers for Children through the Supplemental Nutrition Assistance Program or the Special Supplemental Nutrition Program for Women, Infants, and Children: Benefit Use and Impacts on Food Security and Foods Consumed. *J Acad Nutr Diet*. 2017 Mar;117(3):367-75.e2. doi: 10.1016/j.jand.2016.11.002. PMID: 28017594. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

269. Graham M, Olson CM, Paul K, et al. Using qualitative data to contrast the socio-ecological conditions of low-income pregnant and postpartum women. FASEB Journal. 2013;27. - **Conference/meeting abstract**
270. Grandi SM, Franck C. Agricultural subsidies: Are they a contributing factor to the American obesity epidemic? Archives of Internal Medicine. 2012;172(22):1754-5. doi: 10.1001/2013.jamainternmed.40. - **No original data**
271. Graulau RE, Banna J, Campos M, et al. Amount, Preparation and Type of Formula Consumed and Its Association with Weight Gain in Infants Participating in the WIC Program in Hawaii and Puerto Rico. Nutrients. 2019 Mar 24;11(3)doi: 10.3390/nu11030695. PMID: 30909642. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
272. Greenaway DA. WIC breastfeeding support at risk. Breastfeed Med. 2011 Oct;6:247-8. doi: 10.1089/bfm.2011.9983. PMID: 22007802. -**No original data**
273. Greenberg D, Wise JC, Frijters JC, et al. Persisters and nonpersisters: Identifying the characteristics of who stays and who leaves from adult literacy interventions. Read Writ. 2013 Apr 1;26(4):495-514. doi: 10.1007/s11145-012-9401-8. PMID: 23853419. -**Does not provide any outcome of interest**
274. Greenblatt Y, Gomez S, Alleman G, et al. Optimizing nutrition education in the special supplemental nutrition program for women, infants, and children (WIC). FASEB Journal. 2015;29(1). - **Conference/meeting abstract**
275. Greene M, Hsiang-Hui DK, Hartenbach E, et al. Attempted and Successful VBAC Across Geographic Areas in the United States. Obstetrics and Gynecology. 2019;133(SUPPL 1)doi: 10.1097/01.AOG.0000558764.86820.4a. - **Conference/meeting abstract**
276. Gregory EF, Gross SM, Nguyen TQ, et al. WIC Participation and Breastfeeding at 3 Months Postpartum. Matern Child Health J. 2016 Aug;20(8):1735-44. doi: 10.1007/s10995-016-1977-1. PMID: 26994607. -**No data since 2009**
277. Gregory PM, de Jesus ML. Racial differences in birth outcomes and costs in relation to prenatal WIC participation. N J Med. 2003 Mar;100(3):29-36. PMID: 12674810. -**Other: Pre-2000 data for mortality and child development outcomes**
278. Gregory PM, de Jesus ML. Racial differences in birth outcomes and costs in relation to prenatal WIC participation. N J Med. 2003 Mar;100(3):29-36. PMID: 12674810. - **Other: Pre-2000 data**
279. Greig E, Davis S, Myers O. Women Infants and Children (WIC) Policy change: Effects on fruit and vegetable consumption among low-income children New Mexico.

- Journal of Investigative Medicine. 2011;59(1):144. doi: 10.231/JIM.0b013e31820501bd. - **Conference/meeting abstract**
280. Gross RS, Fierman AH, Mendelsohn AL, et al. Maternal perceptions of infant hunger, satiety, and pressuring feeding styles in an urban Latina WIC population. Acad Pediatr. 2010 Jan-Feb;10(1):29-35. doi: 10.1016/j.acap.2009.08.001. PMID: 20004633. -**No data since 2009**
  281. Gross SM, Augustyn M, Henderson JL, et al. Integrating Obstetrical Care and WIC Nutritional Services to Address Maternal Obesity and Postpartum Weight Retention. Matern Child Health J. 2018 Jun;22(6):794-802. doi: 10.1007/s10995-018-2449-6. PMID: 29417365. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  282. Gross SM, Resnik AK, Cross-Barnet C, et al. The differential impact of WIC peer counseling programs on breastfeeding initiation across the state of Maryland. J Hum Lact. 2009 Nov;25(4):435-43. doi: 10.1177/0890334409342070. PMID: 19652195. -**No data since 2009**
  283. Gross SM, Resnik AK, Nanda JP, et al. Early postpartum: a critical period in setting the path for breastfeeding success. Breastfeed Med. 2011 Dec;6(6):407-12. doi: 10.1089/bfm.2010.0089. PMID: 21453122. -**No data since 2009**
  284. Gueorguieva R, Morse SB, Roth J. Length of prenatal participation in WIC and risk of delivering a small for gestational age infant: Florida, 1996-2004. Matern Child Health J. 2009 Jul;13(4):479-88. doi: 10.1007/s10995-008-0391-8. PMID: 18661219. -**No data since 2009**
  285. Gumirakiza JD, Curtis KR, Bosworth R. Consumer Preferences and Willingness to Pay for Bundled Fresh Produce Claims at Farmers' Markets. Journal of Food Products Marketing. 2017;23(1):61-79. doi: 10.1080/10454446.2017.1244786. - **Does not apply to any of the Key Questions**
  286. Gurley-Calvez T, Bullinger L, Kapinos KA. Effect of the Affordable Care Act on Breastfeeding Outcomes. American Journal of Public Health. 2018;108(2):277-83. doi: 10.2105/AJPH.2017.304108. PMID: 127232595. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  287. Gutierrez O. Economic conditions impact on participation in nutrition assistance programs: Nova Science Publishers, Inc.; 2013. -**No original data**
  288. Gyamfi A, O'Neill B, Henderson WA, et al. Black/African American Breastfeeding Experience: Cultural, Sociological, and Health Dimensions Through an Equity Lens. Breastfeed Med. 2021 Feb;16(2):103-11. doi: 10.1089/bfm.2020.0312. PMID: 33591226. -**Relevant Systematic**



**Review or Dissertation that applies to the question**

289. Gyllstrom ME, McCoy MB, Pezzini G, et al. Leveraging Limited Resources Through Cross-Jurisdictional Sharing: Influences on Breastfeeding Rates. *J Hum Lact*. 2020 Oct 8;890334420963638. doi: 10.1177/0890334420963638. PMID: 33030991. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
290. Hagen MK. Weight management of women of childbearing age: ProQuest Information & Learning; 2016. **-Relevant Systematic Review or Dissertation that applies to the question**
291. Haider SJ, Chang LV, Bolton TA, et al. An evaluation of the effects of a breastfeeding support program on health outcomes. *Health Serv Res*. 2014 Dec;49(6):2017-34. doi: 10.1111/1475-6773.12199. PMID: 25039793. **-No data since 2009**
292. Halpern-Meekin S, Costanzo M, Ehrenthal D, et al. Intimate Partner Violence Screening in the Prenatal Period: Variation by State, Insurance, and Patient Characteristics. *Matern Child Health J*. 2019 Jun;23(6):756-67. doi: 10.1007/s10995-018-2692-x. PMID: 30600519. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
293. Hamad R, Collin DF, Baer RJ, et al. Association of Revised WIC Food

Package with Perinatal and Birth Outcomes: A Quasi-Experimental Study. *Obstetrical and Gynecological Survey*.

2020;75(2):77-8. doi: 10.1097/OGX.0000000000000773.

**-No original data**

294. Hamner HC, Beauregard JL, Li R, et al. Meeting breastfeeding intentions differ by race/ethnicity, Infant and Toddler Feeding Practices Study-2. *Matern Child Nutr*. 2021 Apr;17(2):e13093. doi: 10.1111/mcn.13093. PMID: 33006242. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
295. Hamner HC, Chiang KV, Li R. Returning to Work and Breastfeeding Duration at 12 Months, WIC Infant and Toddler Feeding Practices Study-2. *Breastfeed Med*. 2021 Jul 28doi: 10.1089/bfm.2021.0081. PMID: 34319808. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
296. Hanbury MM, Gomez-Camacho R, Kaiser L, et al. Purchases Made with a Fruit and Vegetable Voucher in a Rural Mexican-Heritage Community. *J Community Health*. 2017 Oct;42(5):942-8. doi: 10.1007/s10900-017-0338-3. PMID: 28364319. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

297. Hand LC. A Virtuous Hearer: An Exploration of Epistemic Injustice and an Ethic of Care in Public Encounters. *Administrative Theory and Praxis*. 2019doi: 10.1080/10841806.2019.1700457. - **No original data**
298. Hand LC. Negotiating healthy self-government a grounded theory study of interactions in Arizona's WIC Program: ProQuest Information & Learning; 2015. - **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
299. Harari N, Rosenthal MS, Bozzi V, et al. Feasibility and acceptability of a text message intervention used as an adjunct tool by WIC breastfeeding peer counsellors: The LATCH pilot. *Matern Child Nutr*. 2018 Jan;14(1)doi: 10.1111/mcn.12488. PMID: 28766913. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
300. Harris HA, Kling SMR, Marini M, et al. Agreement in Infant Growth Indicators and Overweight/Obesity between Community and Clinical Care Settings. *J Acad Nutr Diet*. 2021 Mar;121(3):493-500. doi: 10.1016/j.jand.2020.11.009. PMID: 33339762. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
301. Harris KK, Loyo JJ, Holahan CK, et al. Cross-Sectional Predictors of Reading to Young Children among Participants in the Texas WIC Program. *Journal of Research in Childhood Education*. 2007 01/01;21(3):254. PMID: EJ764540. - **Does not provide any OUTCOME of interest (Mortality, children development)**
302. Harrison G, McNutt S, Weinfield N, et al. National WIC infants and toddlers feeding study. *FASEB Journal*. 2014;28(1). - **Conference/meeting abstract**
303. Harrison M, Sriraman NK, Hawkins S, et al. African american women's perception of breastfeeding over the years. *Breastfeeding Medicine*. 2013;8:S-17. doi: 10.1089/bfm.2013.9982. - **Conference/meeting abstract**
304. Hartenbach E, Hsiang-Hui DK, Greene M, et al. More Blood Transfusions for Rural Women Delivering Low Risk Infants in the United States. *Obstetrics and Gynecology*. 2019;133(SUPPL 1)doi: 10.1097/01.AOG.0000559343.12931.9b. - **Conference/meeting abstract**
305. Hassink SG, Fairbrother G. Obesity and Hunger Threaten the Foundations of Child Health. *Academic Pediatrics*. 2021;21(3):396-400. doi: 10.1016/j.acap.2020.08.010. -**No original data**
306. Haughton J, Gregorio D, Pérez-Escamilla R. Factors associated with breastfeeding duration among Connecticut Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) participants. *J Hum Lact*. 2010

- Aug;26(3):266-73. doi: 10.1177/0890334410365067. PMID: 20689103. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
307. Havens EK, Martin KS, Yan J, et al. Federal nutrition program changes and healthy food availability. *Am J Prev Med.* 2012 Oct;43(4):419-22. doi: 10.1016/j.amepre.2012.06.009. PMID: 22992360. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
308. Haynes-Maslow L, Auvergne L, Mark B, et al. Low-Income Individuals' Perceptions About Fruit and Vegetable Access Programs: A Qualitative Study. *Journal of Nutrition Education & Behavior.* 2015;47(4):317-24. doi: 10.1016/j.jneb.2015.03.005. PMID: 109831397. **-No mention of WIC program**
309. Heinig MJ, Ishii KD, Bañuelos JL, et al. Sources and acceptance of infant-feeding advice among low-income women. *J Hum Lact.* 2009 May;25(2):163-72. doi: 10.1177/0890334408329438. PMID: 19136396. **-No data since 2009**
310. Helms S, Darbishire P, Plake K. Understanding breast-feeding: Beyond medication. *Journal of the American Pharmacists Association.* 2010;50(2):304. doi: 10.1331/JAPhA.2010.10511. **- Conference/meeting abstract**
311. Henderson M. Food shopping patterns and geographic access to food: Comparisons and data: Nova Science Publishers, Inc.; 2015. **-No original data**
312. Herman AN, Malhotra K, Wright G, et al. A qualitative study of the aspirations and challenges of low-income mothers in feeding their preschool-aged children. *Int J Behav Nutr Phys Act.* 2012 Nov 16;9:132. doi: 10.1186/1479-5868-9-132. PMID: 23157723. **-No mention of WIC program**
313. Herring SJ, Albert JJ, Darden N, et al. Targeting pregnancy-related weight gain to reduce disparities in obesity: Baseline results from the Healthy Babies trial. *Contemp Clin Trials.* 2019 Dec;87:105822. doi: 10.1016/j.cct.2019.105822. PMID: 31400513. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
314. Herring SJ, Bersani VM, Santoro C, et al. Feasibility of using a peer coach to deliver a behavioral intervention for promoting postpartum weight loss in Black and Latina mothers. *Translational Behavioral Medicine.* 2021;11(6):1226-34. doi: 10.1093/tbm/ibaa096. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
315. Herring SJ, Bersani VM, Santoro C, et al. Feasibility of using a peer coach to deliver a behavioral intervention for promoting postpartum weight loss in Black and

- Latina mothers. Translational behavioral medicine. 2020doi: 10.1093/tbm/ibaa096. - **Does not provide any OUTCOME of interest (Mortality, children development)**
316. Hetrick RL, Rodrigo OD, Bocchini CE. Addressing Pandemic-Intensified Food Insecurity. Pediatrics. 2020 Oct;146(4)doi: 10.1542/peds.2020-006924. PMID: 32968028. -**No original data**
  317. Hildebrand DA, McCarthy P, Tipton D, et al. Innovative use of influential prenatal counseling may improve breastfeeding initiation rates among WIC Participants. J Nutr Educ Behav. 2014 Nov-Dec;46(6):458-66. doi: 10.1016/j.jneb.2014.05.005. PMID: 24998174. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  318. Hill AM, Nunnery DL, Ammerman A, et al. Racial/Ethnic Differences in Diet Quality and Eating Habits Among WIC Pregnant Women: Implications for Policy and Practice. Am J Health Promot. 2020 Feb;34(2):169-76. doi: 10.1177/0890117119883584. PMID: 31658816. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  319. Hillier A, McLaughlin J, Cannuscio CC, et al. The impact of WIC food package changes on access to healthful food in 2 low-income urban neighborhoods. J Nutr Educ Behav. 2012 May-Jun;44(3):210-6. doi: 10.1016/j.jneb.2011.08.004. PMID: 22405817. -**Does not provide any outcome of interest**
  320. Hingle MD, Shanks CB, Parks C, et al. Examining equitable online federal food assistance during the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): A case study in 2 regions. Current Developments in Nutrition. 2020;4(10)doi: 10.1093/cdn/nzaa154. -**No mention of WIC program**
  321. Holmes AV, Chin NP, Kaczorowski J, et al. A barrier to exclusive breastfeeding for WIC enrollees: limited use of exclusive breastfeeding food package for mothers. Breastfeed Med. 2009 Mar;4(1):25-30. doi: 10.1089/bfm.2008.0110. PMID: 19196037. -**No data since 2009**
  322. Hong JS, Choi J, Espelage DL, et al. Are Children of Welfare Recipients at a Heightened Risk of Bullying and Peer Victimization? Child and Youth Care Forum. 2021;50(3):547-68. doi: 10.1007/s10566-020-09587-w. - **Does not provide any outcome of interest**
  323. Hopkinson J, Konefal Gallagher M. Assignment to a hospital-based breastfeeding clinic and exclusive breastfeeding among immigrant Hispanic mothers: a randomized, controlled trial. J Hum Lact. 2009 Aug;25(3):287-96. doi: 10.1177/0890334409335482. PMID: 19436060. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

324. Hornsby PP, Gurka KK, Conaway MR, et al. Reasons for Early Cessation of Breastfeeding Among Women with Low Income. *Breastfeed Med.* 2019 Jul/Aug;14(6):375-81. doi: 10.1089/bfm.2018.0206. PMID: 30994371. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
325. Hu H, Pearson TA, Zhao J, et al. Geographic disparities in hypertensive disorders of pregnancy: An environment-wide association study. *Circulation.* 2019;139doi: 10.1161/circ.139.suppl\_1.P100. - **Conference/meeting abstract**
326. Hudak KM, Benjamin-Neelon SE. Timing of WIC Enrollment and Responsive Feeding among Low-Income Women in the US. *Int J Environ Res Public Health.* 2021 Jul 20;18(14)doi: 10.3390/ijerph18147695. PMID: 34300147. **-Does not provide any outcome of interest**
327. Hudak KM, Racine EF, Schulkind L. An Increase in SNAP Benefits Did Not Impact Food Security or Diet Quality in Youth. *Journal of the Academy of Nutrition and Dietetics.* 2021;121(3):507-19. doi: 10.1016/j.jand.2020.09.030. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
328. Hughes CC, Sherman SN, Whitaker RC. How low-income mothers with overweight preschool children make sense of obesity. *Qual Health Res.* 2010 Apr;20(4):465-78. doi: 10.1177/1049732310361246. PMID: 20147505. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
329. Huizar MI, Arena R, Laddu DR. The global food syndemic: The impact of food insecurity, Malnutrition and obesity on the healthspan amid the COVID-19 pandemic. *Prog Cardiovasc Dis.* 2021 Jan-Feb;64:105-7. doi: 10.1016/j.pcad.2020.07.002. PMID: 32653438. **-No original data**
330. Hull P, Emerson JS, Quirk ME, et al. A Smartphone App for Families With Preschool-Aged Children in a Public Nutrition Program: Prototype Development and Beta-Testing. *JMIR Mhealth Uhealth.* 2017 Aug 2;5(8):e102. doi: 10.2196/mhealth.7477. PMID: 28768611. **-Does not provide any outcome of interest**
331. Humbert L, Saywell RM, Jr., Zollinger TW, et al. The effect of pregnancy intention on important maternal behaviors and satisfaction with care in a socially and economically at-risk population. *Matern Child Health J.* 2011 Oct;15(7):1055-66. doi: 10.1007/s10995-010-0646-z. PMID: 20652384. **-No data since 2009**
332. Hunt AT. Telelactation and breastfeeding outcomes among low-income mothers in Mississippi: A retrospective cohort study: ProQuest Information & Learning; 2019. **-Relevant Systematic**

**Review or Dissertation that applies to the question**

333. Hunter LL, Meinzen-Derr J, Wiley S, et al. Influence of the WIC Program on Loss to Follow-up for Newborn Hearing Screening. *Pediatrics*. 2016 Jul;138(1)doi: 10.1542/peds.2015-4301. PMID: 27307144. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
334. Hurley KM, Black MM, Merry BC, et al. Maternal mental health and infant dietary patterns in a statewide sample of Maryland WIC participants. *Matern Child Nutr*. 2015 Apr;11(2):229-39. doi: 10.1111/mcn.12004. PMID: 23167622. **-No data since 2009**
335. Hurley KM, Black MM. Commercial baby food consumption and dietary variety in a statewide sample of infants receiving benefits from the special supplemental nutrition program for women, infants, and children. *J Am Diet Assoc*. 2010 Oct;110(10):1537-41. doi: 10.1016/j.jada.2010.07.002. PMID: 20869494. **-No data since 2009**
336. Huynh M, Gildengorin G, Ahmad T. Socio-economic barriers associated with poor glycemic control and elevated BMI in patients with type 1 diabetes mellitus. *Diabetes*. 2010. - **Conference/meeting abstract**
337. Hyden CJ, Bonuck KA. Addition of Solids and Sweeteners in Toddler Bottles and Sippy Cups. *Infant, Child, and Adolescent Nutrition*. 2014;6(4):205-10. doi: 10.1177/1941406414540751. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
338. Isaacs S, Shriver L, Paynter L. Characteristics, Perceptions, and Dietary Intakes of WIC Participants in Rural Appalachia. *Journal of Hunger and Environmental Nutrition*. 2021doi: 10.1080/19320248.2021.1910096. - **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
339. Jacknowitz A, Tiehen L. Transitions into and out of the WIC Program: A cause for concern? *Social Service Review*. 2009;83(2):151-83. doi: 10.1086/600111. **-No data since 2009**
340. Jackson DB, Testa A. Household food insecurity and preschool suspension/expulsion in the United States. *Preventive Medicine*. 2020;141doi: 10.1016/j.ypmed.2020.106283. **-No mention of WIC program**
341. Jacobson LT, Dong F, Scheuermann TS, et al. Smoking Behaviors Among Urban and Rural Pregnant Women Enrolled in the Kansas WIC Program. *J Community Health*. 2015 Oct;40(5):1037-46. doi: 10.1007/s10900-015-0029-x. PMID: 25925718. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

342. Jacobson LT, Twumasi-Ankrah P, Redmond ML, et al. Characteristics associated with breastfeeding behaviors among urban versus rural women enrolled in the Kansas WIC program. *Matern Child Health J*. 2015 Apr;19(4):828-39. doi: 10.1007/s10995-014-1580-2. PMID: 25047788. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
343. Jeans M, Shah S, Vandyousefi S, et al. Metabolic syndrome and associated risk factors in predominately low-income, hispanic children. *Obesity*. 2020;28(SUPPL 2):124. doi: 10.1002/oby.23063. - **Conference/meeting abstract**
344. Jembreili M, Neshat H, Seyyedrasouli A, et al. Comparison of breastmilk odor and vanilla odor on mitigating premature infants' response to pain during and after venipuncture. *Breastfeeding Medicine*. 2015;10(7):362-5. doi: 10.1089/bfm.2015.0060. PMID: 2015-39530-002. **-Non-USA based study**
345. Jenkins JM, Foster EM. The Effects of Breastfeeding Exclusivity on Early Childhood Outcomes. *American Journal of Public Health*. 2014;104(S1):S128-S35. doi: 10.2105/AJPH.2013.301713. PMID: 93883470. **-No data since 2009**
346. Jensen HH, Kreider B, Zhylyevskyy O. Investigating Treatment Effects of Participating Jointly in SNAP and WIC when the Treatment Is Validated Only for SNAP. *Southern Economic Journal*. 2019;86(1):124-55. doi: 10.1002/soej.12365. **-Does not provide any outcome of interest**
347. Jerrett M. Taxing sugar-sweetened beverages to combat the costs of obesity: City-level Taxes and how the federal government should complement them. *Food and Drug Law Journal*. 2018;73(3):465-85. - **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
348. Jiang M, Foster EM, Gibson-Davis CM. The effect of WIC on breastfeeding: A new look at an established relationship. *Children and Youth Services Review*. 2010;32(2):264-73. doi: 10.1016/j.childyouth.2009.09.005. - **No data since 2009**
349. Jilcott Pitts SB, Ng SW, Blitstein JL, et al. Perceived Advantages and Disadvantages of Online Grocery Shopping among Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Participants in Eastern North Carolina. *Curr Dev Nutr*. 2020 May;4(5):nzaa076. doi: 10.1093/cdn/nzaa076. PMID: 32399508. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
350. Jimenez EY, Yonke N, Leeman LM, et al. Disparities in breastfeeding outcomes between women undergoing medication-assisted treatment (MAT) for substance use disorder (SUD) and abstaining controls. *FASEB*

- Journal. 2017;31(1). -  
**Conference/meeting abstract**
351. Johnelle Sparks P. One size does not fit all: an examination of low birthweight disparities among a diverse set of racial/ethnic groups. *Matern Child Health J.* 2009 Nov;13(6):769-79. doi: 10.1007/s10995-009-0476-z. PMID: 19495949. **-No data since 2009**
352. Johnson AA, Hatcher BJ, El-Khorazaty MN, et al. Determinants of inadequate prenatal care utilization by African American women. *Journal of Health Care for the Poor and Underserved.* 2007;18(3):620-36. doi: 10.1353/hpu.2007.0059. PMID: 2007-13604-012. **- Does not provide any OUTCOME of interest (Mortality, children development)**
353. Johnson AM, Correll A, Greene JF, et al. Barriers to breastfeeding in a resident clinic. *Breastfeed Med.* 2013 Jun;8(3):273-6. doi: 10.1089/bfm.2012.0020. PMID: 22871145. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
354. Johnson Gray JM. Considering the curricular impact of lactation consulting/counseling on breastfeeding decisions within two West Virginia county WIC programs: ProQuest Information & Learning; 2011. **-Relevant Systematic Review or Dissertation that applies to the question**
355. Johnson J, Green C, Vladutiu C, et al. 44: Racial disparities in prematurity persist among women of high socioeconomic status (SES). *American Journal of Obstetrics and Gynecology.* 2020;222(1):S37-S8. doi: 10.1016/j.ajog.2019.11.060. -  
**Conference/meeting abstract**
356. Johnson KA, Jones-Smith J, Curriero FC, et al. Low-Income Black and Hispanic Children's Neighborhood Food Environments and Weight Trajectories in Early Childhood. *Acad Pediatr.* 2020 Aug;20(6):784-92. doi: 10.1016/j.acap.2019.11.013. PMID: 31783182. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
357. Johnson P, Montgomery M, Ewell P. Federal Food Assistance Programs and Cardiovascular Risk Factors in Low-Income Preschool Children. *J Community Health.* 2016 Jun;41(3):626-34. doi: 10.1007/s10900-015-0138-6. PMID: 26704910. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
358. Johnson SD. A study evaluating pregnant smokers' attitude toward smoking cessation services: Assessing the impact of a Georgia tobacco cessation program. US: ProQuest Information & Learning; 2008. **- No original data (opinion, descriptive data, letters, editorial, commentary)**
359. Jones KE, Yan Y, Colditz GA, et al. Prenatal counseling on type 2



- diabetes risk, exercise, and nutrition affects the likelihood of postpartum diabetes screening after gestational diabetes. *J Perinatol*. 2018 Apr;38(4):315-23. doi: 10.1038/s41372-017-0035-1. PMID: 29298984. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
360. Jones KE, Yan Y, Herrick CJ. Diet, exercise, and diabetes risk counseling in pregnancy with gestational diabetes increases postpartum diabetes screening. *Diabetes*. 2017;66:A392. - **Conference/meeting abstract**
361. Joseph JA. Regulation & possibilities while feeding children in the margins: Discourses among black cisgender women using WIC services in New York: ProQuest Information & Learning; 2018. - **Conference/meeting abstract**
362. Joyce T, Corman H, Grossman M. A cost-effectiveness analysis of strategies to reduce infant mortality. *Medical care*. 1988;26(4):348-60. - **Other: Pre-2000 data for mortality and child development outcomes**
363. Joyce T, Corman H, Grossman M. A cost-effectiveness analysis of strategies to reduce infant mortality. *Medical care*. 1988;26(4):348-60. - **Other: Pre-2000 data**
364. Jun S, Cowan AE, Eicher-Miller HA, et al. Dietary Supplement Use among U.S. Children by Family Income, Food Security Level, and Nutrition Assistance Program Participation Status in 2011–2014. *Nutrients*. 2018;10(9):1212. doi: 10.3390/nu10091212. PMID: 131938860. **-Does not provide any outcome of interest**
365. Jun S, Cowan AE, Tooze JA, et al. Dietary Supplement Use among U.S. Children by Family Income, Food Security Level, and Nutrition Assistance Program Participation Status in 2011–2014. *Nutrients*. 2018 Sep 1;10(9)doi: 10.3390/nu10091212. PMID: 30200511. **-Does not provide any outcome of interest**
366. Jung S, Nobari TZ, Whaley SE. Breastfeeding Outcomes Among WIC-Participating Infants and Their Relationships to Baby-Friendly Hospital Practices. *Breastfeed Med*. 2019 Jul/Aug;14(6):424-31. doi: 10.1089/bfm.2019.0004. PMID: 31084434. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
367. Kaar JL, Sauder KA, Shapiro ALB, et al. Infant feeding practices in a diverse group of women: The healthy start study. *Clin Med Insights Pediatr*. 2019;13:1-8. doi: 10.1177/1179556518824362. PMID: 30718970. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
368. Kaiser LL, Aguilera AL, Horowitz M, et al. Correlates of food patterns in young Latino children at high risk of obesity. *Public Health Nutr*. 2015 Nov;18(16):3042-50. doi: 10.1017/s1368980014003309.

- PMID: 25631174. **-No mention of WIC program**
369. Kaiser LL, Lamp C, Ganthavorn C, et al. UC cooperative extension explores a farm-to-WIC program. California Agriculture. 2012;66(1):15-9. doi: 10.3733/ca.v066n01p15. **-No original data**
370. Kaiser LL, Melgar-Quinonez HR, Lamp CL, et al. Food security and nutritional outcomes of preschool-age Mexican-American children. J Am Diet Assoc. 2002 Jul;102(7):924-9. doi: 10.1016/s0002-8223(02)90210-5. PMID: 12146552. **- Does not provide any OUTCOME of interest (Mortality, children development)**
371. Kaiser ML, Dionne J, Carr JK. Predictors of Diet-Related Health Outcomes in Food-Secure and Food-Insecure Communities. Soc Work Public Health. 2019;34(3):214-29. doi: 10.1080/19371918.2019.1575313. PMID: 30767652. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
372. Kapinos KA, Bullinger L, Gurley-Calvez T. Lactation Support Services and Breastfeeding Initiation: Evidence from the Affordable Care Act. Health Serv Res. 2017 Dec;52(6):2175-96. doi: 10.1111/1475-6773.12598. PMID: 27861824. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
373. Karvonen KL, Baer RJ, Jelliffe-Pawlowski L, et al. Ed utilization varies by race/ethnicity in premature infants. Journal of Investigative Medicine. 2020;68(1):A169. doi: 10.1136/jim-2019-WMRC.390. **- Conference/meeting abstract**
374. Kasemsup R, Reicks M. The relationship between maternal child-feeding practices and overweight in Hmong preschool children. Ethnicity and Disease. 2006;16(1):187-93. **- Does not provide any OUTCOME of interest (Mortality, children development)**
375. Kathe N, Bhandari NR, Chopra DA, et al. Impact of Arkansas medicaid expansion through premium purchase on the utilization and access to prenatal visits. Value in Health. 2018;21:S146-S7. **- Conference/meeting abstract**
376. Kay MC, Cholera R, Flower KB, et al. Are Low-Income, Diverse Mothers Able to Meet Breastfeeding Intentions After 2 Months of Breastfeeding? Breastfeed Med. 2020 Jul;15(7):435-42. doi: 10.1089/bfm.2020.0025. PMID: 32357088. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
377. Keene Woods N, Reyes J, Chesser A. Infant Mortality and Race in Kansas: Associations With Women, Infants, and Children Services. J Prim Care Community Health. 2016 Jul;7(3):194-8. doi: 10.1177/2150131916635572.

- PMID: 26936839. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
378. Kekeh MA. Association of family history with start of prenatal care: ProQuest Information & Learning; 2014. **-Relevant Systematic Review or Dissertation that applies to the question**
379. Ketterl TG, Dundas NJ, Roncaioli SA, et al. Association of Pre-pregnancy BMI and Postpartum Weight Retention Before Second Pregnancy, Washington State, 2003-2013. Maternal & Child Health Journal. 2018;22(9):1339-44. doi: 10.1007/s10995-018-2514-1. PMID: 131094459. **-No data since 2009**
380. Khan R, Zhu T, Dhar S. The effect of the WIC program on consumption patterns in the cereal category. Quantitative Marketing and Economics. 2018;16(1):79-109. doi: 10.1007/s11129-017-9191-z. **-Does not provide any outcome of interest**
381. Khanani I, Elam J, Hearn R, et al. The impact of prenatal WIC participation on infant mortality and racial disparities. Am J Public Health. 2010 Apr 1;100 Suppl 1(Suppl 1):S204-9. doi: 10.2105/ajph.2009.168922. PMID: 20147683. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
382. Khanna SK. Dietary Transition, Food Security, and Health Promotion. Ecol Food Nutr. 2019 May-Jun;58(3):187-8. doi: 10.1080/03670244.2019.1619245. PMID: 31131658. **-No original data**
383. Khanuja JM. The effects of breastfeeding support on women enrolled for WIC benefits: ProQuest Information & Learning; 2020. **-Relevant Systematic Review or Dissertation that applies to the question**
384. Kim H, Caulfield LE, Rebholz CM, et al. Trends in types of protein in US adolescents and children: Results from the National Health and Nutrition Examination Survey 1999-2010. PLoS One. 2020;15(3):e0230686. doi: 10.1371/journal.pone.0230686. PMID: 32214368. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
385. Kim J, Chagarlamudi H. Perceptions, concerns, and influence of growth charts among low-income mothers. FASEB Journal. 2014;28(1). **-Conference/meeting abstract**
386. Kim J, Mathai RA. Comparison of Feeding Practices in Infants in the WIC Supplemental Nutrition Program Who Were Enrolled in Child Care as Opposed to Those with Parent Care Only. Breastfeed Med. 2015 Sep;10(7):371-6. doi: 10.1089/bfm.2014.0179. PMID: 26251868. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

387. Kim JH, Fiese BH, Donovan SM. Breastfeeding is Natural but Not the Cultural Norm: A Mixed-Methods Study of First-Time Breastfeeding, African American Mothers Participating in WIC. J Nutr Educ Behav. 2017 Jul-Aug;49(7 Suppl 2):S151-S61.e1. doi: 10.1016/j.jneb.2017.04.003. PMID: 28689552. **-No mention of WIC program**
388. Kim L, Koleilat M, Whaley S. Qualitative evaluation of barriers to appropriate gestational weight gain among participants in the special supplemental nutrition program for women, infants and children (WIC). FASEB Journal. 2014;28(1). - **Conference/meeting abstract**
389. Kim LP, Harrison G, Mallo N. Using mixed methods to examine the influence of maternal perception on child weight and feeding practices of Latino WIC mothers. FASEB Journal. 2011;25. - **Conference/meeting abstract**
390. Kim LP, Harrison G, Whaley S, et al. Qualitative examination of cultural influences on diet and physical activity patterns among Latino WIC families. FASEB Journal. 2010;24. - **Conference/meeting abstract**
391. Kim LP, Mallo N. Maternal Perceptions of Self-Weight and Child Weight May Influence Milk Choice of Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). J Obes. 2019;2019:3654728. doi: 10.1155/2019/3654728. PMID: 30719345. **-Is Qualitative study but does not linked to an outcome of interest**
392. Kim LP, Whaley S, Harrison G. Using mixed methods to examine participant utilization and satisfaction with fruit and vegetable vouchers and jarred baby foods in the new WIC food package. FASEB Journal. 2011;25. - **Conference/meeting abstract**
393. Kim LP, Whaley SE, Gradziel PH, et al. Mothers prefer fresh fruits and vegetables over jarred baby fruits and vegetables in the new Special Supplemental Nutrition Program for Women, Infants, and Children food package. J Nutr Educ Behav. 2013 Nov-Dec;45(6):723-7. doi: 10.1016/j.jneb.2013.01.022. PMID: 23591317. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
394. Kim LP, Whaley SS, Harrison GG. Participant utilization and satisfaction with fruits, vegetables and jarred baby foods in the new supplemental nutrition program for Women Infants and Children (WIC) food package. FASEB Journal. 2012;26. - **Conference/meeting abstract**
395. Kinney SK. Maternal participation in WIC and children first as a predictor of birth weight: ProQuest Information & Learning; 2011. - **Relevant Systematic Review or Dissertation that applies to the question**
396. Klawetter S. Warm connections: an integrated behavioral health intervention development study: ProQuest Information & Learning; 2018. **-Does not contain a comparison group or address the**

**association between WIC participation and an outcome of interest**

397. Kleinman RE, Nicklas T. The Women, Infants, and Children Food Package and 100% Fruit Juice. JAMA Pediatr. 2017 Feb 1;171(2):197-8. doi: 10.1001/jamapediatrics.2016.4116. PMID: 27992618. **-No original data**
398. Kling SM, Harris HA, Marini M, et al. Advanced Health Information Technologies to Engage Parents, Clinicians, and Community Nutritionists in Coordinating Responsive Parenting Care: Descriptive Case Series of the Women, Infants, and Children Enhancements to Early Healthy Lifestyles for Baby (WEE Baby) Care Randomized Controlled Trial. JMIR Pediatr Parent. 2020 Nov 24;3(2):e22121. doi: 10.2196/22121. PMID: 33231559. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
399. Kloubec J, Harris C. Food Acquisition Strategies of Homeless Youth in the Greater Seattle Area: A Cross- Sectional Study. Journal of the Academy of Nutrition and Dietetics. 2020doi: 10.1016/j.jand.2020.05.013. **-No mention of WIC program**
400. Ko JY, Tong VT, Bombard JM, et al. Marijuana use during and after pregnancy and association of prenatal use on birth outcomes: A population-based study. Drug Alcohol Depend. 2018 Jun 1;187:72-8. doi: 10.1016/j.drugalcdep.2018.02.017. PMID: 29627409. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
401. Kolasa AM, Krawzak K, Youkhana M, et al. Mind the resource gap: Depleted federal benefits predicts ongoing food insecurity. Pediatrics. 2021;147(3):672. doi: 10.1542/peds.147.3-MeetingAbstract.673. **- Conference/meeting abstract**
402. Koleilat M, Harrison G, Whaley S. The Combination of excessive gestational weight gain and low birth weight is associated with increased obesity risk among young children in low-income households. FASEB Journal. 2011;25. **- Conference/meeting abstract**
403. Koleilat M, Harrison GG, Whaley S, et al. Preschool enrollment is associated with lower odds of childhood obesity among WIC participants in LA County. Matern Child Health J. 2012 Apr;16(3):706-12. doi: 10.1007/s10995-011-0774-0. PMID: 21431308. **-No data since 2009**
404. Koleilat M, Kim LP, Cortes B, et al. Perceived Motivators, Barriers and Intervention Strategies Related to Weight Loss After Childbirth Among WIC Participants in Southern California. Am J Health Promot. 2020 Mar;34(3):294-302. doi: 10.1177/0890117119895948. PMID: 31876168. **-Is Qualitative study but does not linked to an outcome of interest**

405. Koleilat M, Kim LP, Whaley SE. Focusing on Excessive Gestational Weight Gain through Weight Tracking Among Participants of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in Southern California. Californian Journal of Health Promotion. 2017;15(3):15-24. doi: 10.32398/cjhp.v15i3.1905. PMID: 127057695. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
406. Koleilat M, Kim LP, Whaley SE. Improving periconceptional health among WIC participants through the prevention of excessive gestational weight gain: From research to intervention. FASEB Journal. 2013;27. - **Conference/meeting abstract**
407. Koleilat M, Vargas N, Pelina A, et al. Beliefs regarding weight gain during pregnancy among participants of the special supplemental nutrition program for women, infants and children (WIC). FASEB Journal. 2015;29(1). - **Conference/meeting abstract**
408. Koleilat M, Vargas N, vanTwist V, et al. Perceived barriers to and suggested interventions for physical activity during pregnancy among participants of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in Southern California. BMC Pregnancy Childbirth. 2021 Jan 21;21(1):69. doi: 10.1186/s12884-021-03553-7. PMID: 33478407. - **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
409. Koleilat M, Whaley S, Gee D. Gestational weight gain trends among WIC participants in Los Angeles county. FASEB Journal. 2012;26. - **Conference/meeting abstract**
410. Koleilat M, Whaley S, Jiang L. Maternal hospital experiences and exclusive breastfeeding in the first six months among WIC participants. FASEB Journal. 2012;26. - **Conference/meeting abstract**
411. Koleilat M, Whaley SE, Afifi AA, et al. Understanding the Relationship Between the Retail Food Environment Index and Early Childhood Obesity Among WIC Participants in Los Angeles County Using GeoDa. Online J Public Health Inform. 2012;4(1)doi: 10.5210/ojphi.v4i1.3936. PMID: 23569623. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
412. Koleilat M, Whaley SE. Trends and predictors of excessive gestational weight gain among hispanic WIC participants in Southern California. Matern Child Health J. 2013 Oct;17(8):1399-404. doi: 10.1007/s10995-012-1140-6. PMID: 23054447. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
413. Koleilat MN. Ecological predictors of early childhood obesity among

- participants of the Special Supplemental Nutrition Program for Women, Infants and Children (WIC): ProQuest Information & Learning; 2011. **-Relevant Systematic Review or Dissertation that applies to the question**
414. Koumans EH, Harrison A, House LD, et al. Characteristics associated with lack of HIV testing during pregnancy and delivery in 36 U.S. states, 2004-2013. *Int J STD AIDS*. 2018 Oct;29(12):1225-33. doi: 10.1177/0956462418780053. PMID: 29969977. – **Other: No adjusted data**
  415. Kramer MK, Cepak YP, Venditti EM, et al. Evaluation of the Group Lifestyle Balance programme for diabetes prevention in a Hispanic Women, Infants and Children (WIC) Programme population in the USA. *Diversity and Equality in Health and Care*. 2013;10(2):73-83. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  416. Krause KM, Lovelady CA, Peterson BL, et al. Effect of breast-feeding on weight retention at 3 and 6 months postpartum: data from the North Carolina WIC Programme. *Public Health Nutr*. 2010 Dec;13(12):2019-26. doi: 10.1017/s1368980010001503. PMID: 20519049. **-No data since 2009**
  417. Kreider B, Pepper JV, Roy M. DOES THE WOMEN, INFANTS, AND CHILDREN PROGRAM IMPROVE INFANT HEALTH OUTCOMES? *Economic Inquiry*. 2020doi: 10.1111/ecin.12900. **-No data since 2009**
  418. Kreider B, Pepper JV, Roy M. Identifying the effects of WIC on food insecurity among infants and children. *Southern Economic Journal*. 2016;82(4):1106-22. doi: 10.1002/soej.12078. **-No data since 2009**
  419. Krummel D, Semmens E, MacBride AM, et al. Lessons learned from the mothers' overweight management study in 4 West Virginia WIC offices. *J Nutr Educ Behav*. 2010 May-Jun;42(3 Suppl):S52-8. doi: 10.1016/j.jneb.2010.02.012. PMID: 20399410. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
  420. Kuo A, Inkelas M, Slusser W, et al. Introduction of Solid Food to Young Infants. *Maternal & Child Health Journal*. 2011;15(8):1185-94. doi: 10.1007/s10995-010-0669-5. PMID: 104703647. **-No data since 2009**
  421. Landau TV. Breastfeeding case study: New York City--the WIC Program's vital role in breastfeeding success. *Breastfeed Med*. 2011 Oct;6:277-9. doi: 10.1089/bfm.2011.0067. PMID: 22007809. **-No original data**
  422. Langellier BA, Pia Chaparro M, Whaley SE. Social and institutional factors that affect breastfeeding duration among WIC participants in Los Angeles County, California. *Matern Child Health J*. 2012 Dec;16(9):1887-95. doi: 10.1007/s10995-011-0937-z. PMID: 22205423. **-No data since 2009**

423. Laraia BA, Borja JB, Bentley ME. Grandmothers, fathers, and depressive symptoms are associated with food insecurity among low-income first-time African-American mothers in North Carolina. *J Am Diet Assoc.* 2009 Jun;109(6):1042-7. doi: 10.1016/j.jada.2009.03.005. PMID: 19465186. **-No data since 2009**
424. Lazariu-Bauer V, Stratton H, Pruzek R, et al. A comparative analysis of effects of early versus late prenatal WIC participation on birth weight: NYS, 1995. *Maternal & Child Health Journal.* 2004;8(2):77-86. doi: 10.1023/b:maci.0000025730.02966.62. PMID: 106656248. **- Does not provide any OUTCOME of interest (Mortality, children development)**
425. Le HN, Perry D, Yengo J, et al. Integrating screening for perinatal depression into community-based settings: Lessons learned from the women, infants, and children's (WIC) program. *Archives of Women's Mental Health.* 2013;16:S79-S80. doi: 10.1007/s00737-013-0355-x. **- Conference/meeting abstract**
426. Lee CHM, O'Leary J, Kirk P, et al. Breastfeeding Outcomes in Washington State: Determining the Effect of Loving Support Peer Counseling Program and Characteristics of Participants at WIC Agencies. *J Nutr Educ Behav.* 2018 Apr;50(4):379-87.e1. doi: 10.1016/j.jneb.2017.09.002. PMID: 29056310. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
427. Leigh JP, Medel-Herrero A. Participation in the Women, Infants, and Children (WIC) Program as Reported by Documented and Undocumented Farm Worker Adults in the Households. *J Agromedicine.* 2015;20(4):409-18. doi: 10.1080/1059924x.2015.1074973. PMID: 26471950. **-Does not provide any outcome of interest**
428. Leonard SA, Gee D, Zhu Y, et al. Associations between preterm birth, low birth weight, and postpartum health in a predominantly Hispanic WIC population. *J Nutr Educ Behav.* 2014 Nov-Dec;46(6):499-505. doi: 10.1016/j.jneb.2014.06.008. PMID: 25092236. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
429. Lessen R. Breastfeeding 101: The state of breastfeeding in the United States. *Topics in Clinical Nutrition.* 2012;27(3):196-205. doi: 10.1097/TIN.0b013e3182625b21. **- No original data**
430. Leung CW, Musicus AA, Willett WC, et al. Improving the Nutritional Impact of the Supplemental Nutrition Assistance Program:: Perspectives From the Participants. *Am J Prev Med.* 2017 Feb;52(2 Suppl 2):S193-s8. doi: 10.1016/j.amepre.2016.07.024. PMID: 28109422. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
431. Leung P, Cheng T, Khare M, et al. Food insecurity in families of overweight/obese children enrolled in



- the wholesome wave fruit & vegetable prescription program® (FVRX®) in New York City Public Hospitals. *Pediatrics*. 2018;141(1)doi: 10.1542/peds.141.1-MeetingAbstract.215. -  
**Conference/meeting abstract**
432. Lewis CW, Linsenmayer KA, Williams A. Wanting better: a qualitative study of low-income parents about their children's oral health. *Pediatr Dent*. 2010 Nov-Dec;32(7):518-24. PMID: 21462765. **-Does not provide any outcome of interest**
433. Li X, McLaughlin PW, Saitone TL, et al. The Magnitude and Determinants of Partial Redemptions of Food Benefits in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). *Am J Health Promot*. 2021 Jul;35(6):775-83. doi: 10.1177/0890117121992307. PMID: 33611926. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
434. Lieff SA, Bangia D, Baronberg S, et al. Evaluation of an Educational Initiative to Promote Shopping at Farmers' Markets Among the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Participants in New York City. *J Community Health*. 2017 Aug;42(4):701-6. doi: 10.1007/s10900-016-0306-3. PMID: 27943033. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
435. Lin TF, Huang JN, Cash HL. Investigation of Pediatric Anemia in the Commonwealth of the Northern Mariana Islands. *Maternal & Child Health Journal*. 2019;23(3):416-21. doi: 10.1007/s10995-018-02713-0. PMID: 134997100. **-No mention of WIC program**
436. Lind JN, Perrine CG, Li R, et al. Racial disparities in access to maternity care practices that support breastfeeding - United States, 2011. *MMWR: Morbidity & Mortality Weekly Report*. 2014;63(33):725-8. PMID: 103989309. Corporate Author: Epidemic Intelligence Service, CDC. **-No mention of WIC program**
437. Lindberg SM, Adams AK, Prince RJ. Predictors and consequences of early childhood weight status among American Indian youth. *Obesity*. 2010;18:S194. - **Conference/meeting abstract**
438. Lindsay A, Greaney M, Sussner K, et al. Socio-cultural, organizational, and community level influences on physical activity levels of latino preschool-aged children: A qualitative study. *Annals of Nutrition and Metabolism*. 2013;63:432. doi: 10.1159/000354245. -  
**Conference/meeting abstract**
439. Lindsay AC, Sussner KM, Greaney ML, et al. Influence of social context on eating, physical activity, and sedentary behaviors of Latina mothers and their preschool-age children. *Health Educ Behav*. 2009 Feb;36(1):81-96. doi: 10.1177/1090198107308375. PMID: 18689491. **-No data since 2009**

440. Litt JS, Perrin JM. Influence of Clinical and Sociodemographic Characteristics on Early Intervention Enrollment After NICU Discharge. *Journal of Early Intervention*. 2014;36(1):37-48. doi: 10.1177/1053815114555575. PMID: 103920955. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
441. Liu J, Kuo T, Jiang L, et al. Food and drink consumption among 1-5-year-old Los Angeles County children from households receiving dual SNAP and WIC v. only WIC benefits. *Public Health Nutr*. 2017 Oct;20(14):2478-85. doi: 10.1017/s1368980016002329. PMID: 27609603. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
442. Liu J, Rehm CD, Onopa J, et al. Trends in Diet Quality Among Youth in the United States, 1999-2016. *Jama*. 2020 Mar 24;323(12):1161-74. doi: 10.1001/jama.2020.0878. PMID: 32207798. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
443. Liu ST, Geidenberger C. Comparing incentives to increase response rates among African Americans in the Ohio pregnancy risk assessment monitoring system. *Matern Child Health J*. 2011 May;15(4):527-33. doi: 10.1007/s10995-010-0609-4. PMID: 20428935. **-Does not provide any outcome of interest**
444. Lockner DW, Kibbe D, Marley SC, et al. Get healthy together: a program to improve counseling for childhood obesity in community-based WIC clinics. *J Health Care Poor Underserved*. 2014 May;25(2):771-86. doi: 10.1353/hpu.2014.0085. PMID: 24858885. **-Does not provide any outcome of interest**
445. Loggins Clay S, Griffin M, Averhart W. Black/White disparities in pregnant women in the United States: An examination of risk factors associated with Black/White racial identity. *Health & Social Care in the Community*. 2018;26(5):654-63. doi: 10.1111/hsc.12565. PMID: 131189590. **-No mention of WIC program**
446. Lombardi DJ. Child nutrition and the WIC program: Nova Science Publishers, Inc.; 2011. **-No original data**
447. Loosier PS, Haderxhanaj L, Beltran O, et al. Food Insecurity and Risk Indicators for Sexually Transmitted Infection Among Sexually Active Persons Aged 15-44, National Survey of Family Growth, 2011-2017. *Public Health Rep*. 2020 Mar/Apr;135(2):270-81. doi: 10.1177/0033354920904063. PMID: 32031921. **-Does not apply to any of the Key Questions**
448. Lora K, Branscum P, Anderson M. Participation in government nutrition assistance programs and purchase of sugar-sweetened beverages of low-income mothers of preschool children. *FASEB Journal*. 2014;28(1). **- Conference/meeting abstract**
449. Lorts CE. The community food environment's influence on dietary

- behaviors: ProQuest Information & Learning; 2018. **-Relevant Systematic Review or Dissertation that applies to the question**
450. Lovelace A, Schetzina KE, Jaishankar G. Juice consumption among children aged 9 to 24 months participating in women, infants, and children (wic) program. Pediatrics. 2018;141(1)doi: 10.1542/peds.141.1-MeetingAbstract.587. - **Conference/meeting abstract**
451. Lovera D, Sanderson M, Bogle ML, et al. Evaluation of a breastfeeding peer support program for fathers of Hispanic participants in a Texas special supplemental nutrition program for women, infants, and children. J Am Diet Assoc. 2010 Nov;110(11):1696-702. doi: 10.1016/j.jada.2010.08.001. PMID: 21034883. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
452. Low D. Improving oral health literacy and breastfeeding practices in cut bank, Montana. Journal of Investigative Medicine. 2014;62(1):254. doi: 10.231/JIM.0000000000000033. - **Conference/meeting abstract**
453. Lowe JB, Baxter L, Hirokawa R, et al. Description of a media campaign about alcohol use during pregnancy. J Stud Alcohol Drugs. 2010 Sep;71(5):739-41. doi: 10.15288/jsad.2010.71.739. PMID: 20731980. **-No data since 2009**
454. Lu W, McKyer EL, Dowdy D, et al. Evaluating the Influence of the Revised Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Food Allocation Package on Healthy Food Availability, Accessibility, and Affordability in Texas. J Acad Nutr Diet. 2016 Feb;116(2):292-301. doi: 10.1016/j.jand.2015.10.021. PMID: 26673523. **-Does not provide any outcome of interest**
455. Lutenbacher M, Karp S, Moore E. Reflections of Black Women Who Choose to Breastfeed: Influences, Challenges and Supports. Maternal & Child Health Journal. 2016;20(2):231-9. doi: 10.1007/s10995-015-1822-y. PMID: 112693327. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
456. Luthy KE, Anderson A, Macintosh J, et al. A Whooping Cough Education Module for WIC Clients in Utah. MCN Am J Matern Child Nurs. 2017 Sep/Oct;42(5):283-8. doi: 10.1097/nmc.0000000000000358. PMID: 28816807. **-Does not provide any outcome of interest**
457. Lyerly R, Rummo P, Amin S, et al. Effectiveness of mobile produce markets in increasing access and affordability of fruits and vegetables among low-income seniors. Public health nutrition. 2020;23(17):3226-35. doi: 10.1017/S1368980020002931. **-No mention of WIC program**
458. Ma YJ, Tobo B, Wan L, et al. Racial disparities in the association between total gestational weight gain and gestational diabetes mellitus by pre-pregnancy BMI. American Journal of Obstetrics and Gynecology.

- 2015;212(1):S353-S4. doi:  
10.1016/j.ajog.2014.10.932. -  
**Conference/meeting abstract**
459. Mann G, Cafer A, Kaiser K, et al.  
Community resilience in a rural food  
system: documenting pathways to  
nutrition solutions. Public Health.  
2020;186:157-63. doi:  
10.1016/j.puhe.2020.06.041. -**No  
mention of WIC program**
460. Mao CY, Narang S, Lopreiato J.  
Breastfeeding practices in military  
families: a 12-month prospective  
population-based study in the national  
capital region. Mil Med. 2012  
Feb;177(2):229-34. doi:  
10.7205/milmed-d-11-00181. PMID:  
22360072. -**No data since 2009**
461. Marchi KS, Braveman PA, Martin K,  
et al. Eligibility and enrollment in the  
Special Supplemental Nutrition  
Program for Women, Infants, and  
Children (WIC) - 27 states and New  
York City, 2007-2008. Morbidity and  
Mortality Weekly Report.  
2013;62(10):189-93. -**Does not  
contain a comparison group or  
address the association between  
WIC participation and an outcome  
of interest**
462. Markovitz BP, Cook R, Flick LH, et  
al. Socioeconomic factors and  
adolescent pregnancy outcomes:  
distinctions between neonatal and  
post-neonatal deaths? BMC Public  
Health. 2005 Jul 25;5:79. doi:  
10.1186/1471-2458-5-79. PMID:  
16042801. -**Other: Pre-2000 data  
for mortality and child  
development outcomes**
463. Markovitz BP, Cook R, Flick LH, et  
al. Socioeconomic factors and  
adolescent pregnancy outcomes:  
distinctions between neonatal and  
post-neonatal deaths? BMC Public  
Health. 2005 Jul 25;5:79. doi:  
10.1186/1471-2458-5-79. PMID:  
16042801. -**Other: Pre-2000 data**
464. Marshall C, Gavin L, Bish C, et al.  
WIC participation and breastfeeding  
among White and Black mothers: data  
from Mississippi. Matern Child  
Health J. 2013 Dec;17(10):1784-92.  
doi: 10.1007/s10995-012-1198-1.  
PMID: 23203317. -**No data since  
2009**
465. Martin KS, Wolff M, Lonzak M, et  
al. Formative research to examine  
collaboration between special  
supplemental nutrition program for  
woman, infants, and children and  
head start programs. Matern Child  
Health J. 2014 Jan;18(1):326-32. doi:  
10.1007/s10995-013-1237-6. PMID:  
23417212. -**Does not provide any  
outcome of interest**
466. Martin MA, Lippert AM. Feeding  
her children, but risking her health:  
the intersection of gender, household  
food insecurity and obesity. Soc Sci  
Med. 2012 Jun;74(11):1754-64. doi:  
10.1016/j.socscimed.2011.11.013.  
PMID: 22245381. -**No data since  
2009**
467. Martinez-Brockman JL, Harari N,  
Goeschel L, et al. A qualitative  
analysis of text message  
conversations in a breastfeeding peer  
counseling intervention. Matern  
Child Nutr. 2020 Apr;16(2):e12904.  
doi: 10.1111/mcn.12904. PMID:  
31823503. -**Does not provide any  
outcome of interest**
468. Martinez-Brockman JL, Harari N,  
Perez-Escamilla R. Lactation advice  
through texting can help (LATCH):

- An analysis of intensity of engagement via two-way text messaging. FASEB Journal. 2017;31(1). **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
469. Martinez-Brockman JL, Harari N, Pérez-Escamilla R. Lactation Advice through Texting Can Help: An Analysis of Intensity of Engagement via Two-Way Text Messaging. J Health Commun. 2018;23(1):40-51. doi: 10.1080/10810730.2017.1401686. PMID: 29236569. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
470. Martinez-Brockman JL, Harari N, Segura-Perez S, et al. Impact of the lactation advice through texting can help (LATCH) randomized controlled trial. FASEB Journal. 2017;31(1). - **Conference/meeting abstract**
471. Martinez-Brockman JL, Shebl FM, Harari N, et al. An assessment of the social cognitive predictors of exclusive breastfeeding behavior using the Health Action Process Approach. Soc Sci Med. 2017 Jun;182:106-16. doi: 10.1016/j.socscimed.2017.04.014. PMID: 28437693. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
472. Masciale M, Bocchini C, Lopez M, et al. Assessment, Perspectives, and Barriers to Immigrant Utilization of Public Resources. Pediatrics. 2020;146(1):584-5. doi: 10.1542/peds.146.1\_MeetingAbstract.584. - **Conference/meeting abstract**
473. Masciale M, Lopez M, Fredricks K, et al. Assessment of public resource use and immigration-related fear in families of mixed immigration status: A survey-based cross-sectional study. Pediatrics. 2021;147(3):670-1. doi: 10.1542/peds.147.3-MeetingAbstract.672. - **Conference/meeting abstract**
474. Masciale M, Lopez MA, Yu X, et al. Public Benefit Use and Social Needs in Hospitalized Children With Undocumented Parents. Pediatrics. 2021 Jun 10 doi: 10.1542/peds.2020-021113. PMID: 34112659. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
475. Masho SW, Rozario SS, Ferrance JL. Intimate Partner Violence Around the Time of Pregnancy and Utilization of WIC Services. Matern Child Health J. 2019 Dec;23(12):1648-57. doi: 10.1007/s10995-019-02811-7. PMID: 31535257. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
476. Mason DJ. Food Insecurity and a Threatened Safety Net. Jama. 2020 Feb 4;323(5):406-7. doi: 10.1001/jama.2019.22150. PMID: 32016299. **-No original data**
477. Mason K. Women, infants, and (fat) children: Hidden “obesity epidemic” discourse and the practical politics of health promotion at WIC. Fat Studies. 2016;5(2):116-36. doi:

- 10.1080/21604851.2016.1144422. **-Is Qualitative study but does not linked to an outcome of interest**
478. Mathai RA, Kim J. Nutrient intake of WIC infants by child care and parent care. *FASEB Journal*. 2011;25. - **Conference/meeting abstract**
479. Mathews L, Morris MN, Schneider J, et al. The relationship between food security and poor health among female WIC participants. *Journal of Hunger and Environmental Nutrition*. 2010;5(1):85-99. doi: 10.1080/19320240903582679. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
480. Mattheus D, Shannon M, Burke K, et al. Benefits of oral health education at WIC clinic visits: Assessments of parent's oral health beliefs, behaviors and dental access in Oahu Hawai'i. *Pediatrics*. 2019;144(2)doi: 10.1542/peds.144.2-MeetingAbstract.712. - **Conference/meeting abstract**
481. Mattingly CL. Examining predictors of birth outcomes: Implications for early childhood development and policy: ProQuest Information & Learning; 2021. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
482. May R, Barber J, Simpson T, et al. Growth pattern of overweight preschool children in the Siouxland WIC program. *Am J Hum Biol*. 2002 Nov-Dec;14(6):769-76. doi: 10.1002/ajhb.10094. PMID: 12400038. - **Does not provide any**
- OUTCOME of interest (Mortality, children development)**
483. May RL, Kim D. Birth size, early weight gain, and diet: Relationships to weight-for-length during the first year. *American Journal of Physical Anthropology*. 2012;147:206. doi: 10.1002/ajpa.22033. - **Conference/meeting abstract**
484. Mayer VL, Deshpande R, Brown D, et al. Feasibility of a subsidized farmshare program in primary care practices. *Journal of General Internal Medicine*. 2020;35(SUPPL 1):S131-S2. doi: 10.1007/s11606-020-05890-3. **-Does not provide any outcome of interest**
485. Mayer VL, Deshpande R, Brown D, et al. Impact of a subsidized farm share program on diet and food security: Results of a pilot randomized controlled trial. *Journal of General Internal Medicine*. 2020;35(SUPPL 1):S158. doi: 10.1007/s11606-020-05890-3. - **Conference/meeting abstract**
486. Mayer VL, Hillier A, Bachhuber MA, et al. Food insecurity, neighborhood food access, and food assistance in Philadelphia. *J Urban Health*. 2014 Dec;91(6):1087-97. doi: 10.1007/s11524-014-9887-2. PMID: 25047157. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
487. McCabe BK, Potash D, Omohundro E, et al. Seven-month pilot of an integrated, continuous evaluation, and quality improvement system for a state-based home-visiting program. *Matern Child Health J*. 2012

- Oct;16(7):1401-12. doi: 10.1007/s10995-011-0905-7. PMID: 22246712. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
488. McCormick MC, Deal LW, Devaney BL, et al. The impact on clients of a community-based infant mortality reduction program: the National Healthy Start Program Survey of Postpartum Women. *Am J Public Health*. 2001 Dec;91(12):1975-7. doi: 10.2105/ajph.91.12.1975. PMID: 11726379. **- No mention of WIC program**
489. McCoy MB, Heggie P. In-Hospital Formula Feeding and Breastfeeding Duration. *Pediatrics*. 2020 Jul;146(1)doi: 10.1542/peds.2019-2946. PMID: 32518168. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
490. McCurdy K, Kisler T, Gorman K, et al. Associations between economic disadvantage and maternal body weight among low-income mothers of preschool age children. *Journal of Women's Health*. 2014;23(4):30. doi: 10.1089/jwh.2014.Ab01.abstracts. **- Conference/meeting abstract**
491. McCurdy K, Metallinos-Katsaras E. Sociodemographic determinants of food security status among first-time WIC participants. *Topics in Clinical Nutrition*. 2011;26(3):216-28. doi: 10.1097/TIN.0b013e3182260d4e. **- Does not provide any outcome of interest**
492. McDonnell CG, Valentino K. Intergenerational Effects of Childhood Trauma: Evaluating Pathways Among Maternal ACEs, Perinatal Depressive Symptoms, and Infant Outcomes. *Child Maltreat*. 2016 Nov;21(4):317-26. doi: 10.1177/1077559516659556. PMID: 27457410. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
493. McDonnell L, Morris MN, Holland J. WIC Participants' Perceived Behavioral Control, Attitudes Toward, and Factors Influencing Behavioral Intentions to Redeeming Cash-Value Vouchers at Certified Farmers Markets. *Californian Journal of Health Promotion*. 2014;12(2):22-31. doi: 10.32398/cjhp.v12i2.2147. PMID: 142192877. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
494. McElligott JT, Roberts JR, Varadi EA, et al. Variation in fruit juice consumption among infants and toddlers: associations with WIC participation. *South Med J*. 2012 Jul;105(7):364-9. doi: 10.1097/SMJ.0b013e31825c0252. PMID: 22766665. **-No data since 2009**
495. McElrone M, Zimmer MC, Anderson Steeves ET. A Qualitative Exploration of Predominantly White Non-Hispanic Tennessee WIC Participants' Food Retail and WIC Clinic Experiences During COVID-19. *J Acad Nutr Diet*. 2021 Feb 2doi: 10.1016/j.jand.2020.12.011. PMID:

33547032. **-Is Qualitative study but does not linked to an outcome of interest**
496. McEwen MK, Yaun J, Correa L, et al. Breastfeeding versus formula feeding in an urban academic general pediatrics clinic. *Journal of Investigative Medicine*. 2021;69(2):469. doi: 10.1136/jim-2021-SRMC.130. - **Conference/meeting abstract**
497. McFarren H, Vazquez C, Jacobs EA, et al. Understanding feeding practices of Latinx mothers of infants and toddlers at risk for childhood obesity: A qualitative study. *Matern Child Nutr*. 2020 Jul;16(3):e12983. doi: 10.1111/mcn.12983. PMID: 32141225. **-Is Qualitative study but does not linked to an outcome of interest**
498. McGarvey E, Keller A, Forrester M, et al. Feasibility and benefits of a parent-focused preschool child obesity intervention. *American Journal of Public Health*. 2004;94(9):1490-5. doi: 10.2105/AJPH.94.9.1490. - **Does not provide any OUTCOME of interest (Mortality, children development)**
499. McGarvey EL, Collie KR, Fraser G, et al. Using focus group results to inform preschool childhood obesity prevention programming. *Ethnicity & Health*. 2006;11(3):265-85. doi: 10.1080/13557850600565707. PMID: 106163093. - **Does not provide any OUTCOME of interest (Mortality, children development)**
500. McGuirt JT, Jilcott Pitts SB, Gustafson A. Association between Spatial Access to Food Outlets, Frequency of Grocery Shopping, and Objectively-Assessed and Self-Reported Fruit and Vegetable Consumption. *Nutrients*. 2018 Dec 13;10(12)doi: 10.3390/nu10121974. PMID: 30551652. **-Does not provide any outcome of interest**
501. McKechnie AC, Tluczek A, Henriques JB. Maternal Variables Influencing Duration of Breastfeeding Among Low-Income Mothers. *Infant Child Adolesc Nutr*. 2009 Jun 1;1(3):126-32. doi: 10.1177/1941406409334379. PMID: 21544253. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
502. McKinney CO, Hahn-Holbrook J, Chase-Lansdale PL, et al. Racial and Ethnic Differences in Breastfeeding. *Pediatrics*. 2016 Aug;138(2)doi: 10.1542/peds.2015-2388. PMID: 27405771. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
503. McLaury KC, Blue Bird Jernigan V, Johnson DB, et al. Variation in WIC Cash-Value Voucher Redemption among American Indian Reservation Communities in Washington State. *J Hunger Environ Nutr*. 2016;11(2):254-62. doi: 10.1080/19320248.2015.1112755. PMID: 27453765. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
504. McLemore MR, Berkowitz RL, Oltman SP, et al. Risk and Protective Factors for Preterm Birth Among



- Black Women in Oakland, California. J Racial Ethn Health Disparities. 2020 Oct 9;doi: 10.1007/s40615-020-00889-2. PMID: 33034878. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
505. McPherson-Ventura D. Is parenting style related to overweight in Mexican or Mexican-American preschoolers? : University of San Diego; 2010. **-Relevant Systematic Review or Dissertation that applies to the question**
506. Mehta-Lee S, Xu L, Lischewski Goel J, et al. Excess gestational weight gain leads to post-partum weight retention. American Journal of Obstetrics and Gynecology. 2012;206(1):S262. doi: 10.1016/j.ajog.2011.10.594. - **Conference/meeting abstract**
507. Mercado A, Phelan S. Can an internet program help mothers lose weight after pregnancy? Front Young Minds. 2018;6;doi: 10.3389/frym.2018.00034. PMID: 30906738. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
508. Merjaneh N, Alissa R, Williams P, et al. Role of donor milk supplementation in newborn nursery level 1 in improving exclusive breastfeeding rate at six months of life. Pediatrics. 2019;144(2);doi: 10.1542/peds.144.2-MeetingAbstract.270. - **Conference/meeting abstract**
509. Metallinos-Katsaras E, Brown L, Colchamiro R. Maternal WIC participation improves breastfeeding rates: a statewide analysis of WIC participants. Matern Child Health J. 2015 Jan;19(1):136-43. doi: 10.1007/s10995-014-1504-1. PMID: 24777674. **-No data since 2009**
510. Metallinos-Katsaras E, Colchamiro R, Edelstein S, et al. Household Food Security Status Is Associated with Anemia Risk at Age 18 Months among Low-Income Infants in Massachusetts. J Acad Nutr Diet. 2016 Nov;116(11):1760-6. doi: 10.1016/j.jand.2016.06.008. PMID: 27451132. **-No data since 2009**
511. Metallinos-Katsaras E, Gorman KS, Wilde P, et al. A longitudinal study of WIC participation on household food insecurity. Matern Child Health J. 2011 Jul;15(5):627-33. doi: 10.1007/s10995-010-0616-5. PMID: 20455015. **-No data since 2009**
512. Metallinos-Katsaras E, Must A, Gorman K. A longitudinal study of food insecurity on obesity in preschool children. J Acad Nutr Diet. 2012 Dec;112(12):1949-58. doi: 10.1016/j.jand.2012.08.031. PMID: 23174682. **-No data since 2009**
513. Metallinos-Katsaras ES, Siu EC, Brown L, et al. Predictors of excessive weight gain in a low income and diverse population of massachusetts infants. FASEB Journal. 2012;26. - **Conference/meeting abstract**
514. Mickens AD, Modeste N, Montgomery S, et al. Peer support and breastfeeding intentions among black WIC participants. J Hum Lact. 2009 May;25(2):157-62. doi:

- 10.1177/0890334409332438. PMID: 19414821. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
515. Mitchell SC, West CA, Lockwood SA. Community dental health coordinators' role in community-based pediatric dental education. J Dent Educ. 2021 Mar 26doi: 10.1002/jdd.12593. PMID: 33772781. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
516. Mitra AK, Khoury AJ, Carothers C, et al. Evaluation of a comprehensive loving support program among state women, infants, and children (WIC) program breast-feeding coordinators. Southern Medical Journal. 2003;96(2):168-71. doi: 10.1097/01.SMJ.0000053675.41623.1 5. **- Does not provide any OUTCOME of interest (Mortality, children development)**
517. Mitra AK, Khoury AJ, Hinton AW, et al. Predictors of breastfeeding intention among low-income women. Maternal & Child Health Journal. 2004;8(2):65-70. doi: 10.1023/b:maci.0000025728.54271.2 7. PMID: 106656247. **- Does not provide any OUTCOME of interest (Mortality, children development)**
518. Moberly T. Food banks may close as covid cases surge, charity warns. The BMJ. 2021;372doi: 10.1136/bmj.n27. **-No original data**
519. Molina J, Amaro K, Pérez CM, et al. Sleep Duration, Sedentary Behaviors, and Physical Activity across Weight Status in Hispanic Toddlers' Participants of the WIC Program. J Child Obes. 2016;1(4)doi: 10.21767/2572-5394.100017. PMID: 28018993. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
520. Moniaci M, Kim Y, Pobocik R. Perceptions of Breastfeeding Attitudes of Overweight Women in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): A Qualitative Study with Breastfeeding Educators. Journal of the Academy of Nutrition & Dietetics. 2016;116:A28-A. doi: 10.1016/j.jand.2016.06.090. PMID: 117496530. **- Conference/meeting abstract**
521. Monsivais P, Thompson C, Astbury CC, et al. Environmental approaches to promote healthy eating: Is ensuring affordability and availability enough? The BMJ. 2021;372doi: 10.1136/bmj.n549. **-No original data**
522. Moon RY, Oden RP, Grady KC. Back to Sleep: an educational intervention with women, infants, and children program clients. Pediatrics. 2004 Mar;113(3 Pt 1):542-7. doi: 10.1542/peds.113.3.542. PMID: 14993547. **- Does not provide any OUTCOME of interest (Mortality, children development)**
523. Moore AM, Clair-Michaud M, Melanson KJ, et al. A Pilot Feasibility Study to Improve Food Parenting Practices. Am J Health Behav. 2018 Mar 1;42(2):61-70. doi: 10.5993/ajhb.42.2.6. PMID: 29458515. **-Does not contain a comparison group or address the**

**association between WIC participation and an outcome of interest**

524. Moore AM, Vadiveloo M, McCurdy K, et al. A recurrent cross-sectional qualitative study exploring how low-income mothers define snacks and reasons for offering snacks during infancy. *Appetite*. 2021 Jul 1;162:105169. doi: 10.1016/j.appet.2021.105169. PMID: 33610639. **-Is Qualitative study but does not linked to an outcome of interest**
525. Morales ME, Berkowitz SA. The Relationship Between Food Insecurity, Dietary Patterns, and Obesity. *Current Nutrition Reports*. 2016;5(1):54-60. doi: 10.1007/s13668-016-0153-y. - **Relevant Systematic Review or Dissertation that applies to the question**
526. Morel K, Nichols K, Nong Y, et al. Parental and Provider Perceptions of Sugar-Sweetened Beverage Interventions in the First 1000 Days: A Qualitative Study. *Acad Pediatr*. 2019 Sep-Oct;19(7):748-55. doi: 10.1016/j.acap.2019.01.004. PMID: 30677540. **-Is Qualitative study but does not linked to an outcome of interest**
527. Morris G, Bailey-Davis L, Cochran W, et al. Perceptions about care coordination between pediatricians and women, infants and children (WIC) for early childhood obesity prevention. *Pediatrics*. 2018;141(1)doi: 10.1542/peds.141.1-MeetingAbstract.590. - **Conference/meeting abstract**
528. Moss NE, Carver K. The effect of WIC and Medicaid on infant mortality in the United States. *American Journal of Public Health*. 1998;88(9):1354-61. doi: 10.2105/AJPH.88.9.1354. **-Other: Pre-2000 data for mortality and child development outcomes**
529. Moss NE, Carver K. The effect of WIC and Medicaid on infant mortality in the United States. *American Journal of Public Health*. 1998;88(9):1354-61. doi: 10.2105/AJPH.88.9.1354. - **Other: Pre-2000 data**
530. Mullen SM, Marshall A, Warren MD. Statewide Breastfeeding Hotline Use Among Tennessee WIC Participants. *J Nutr Educ Behav*. 2017 Jul-Aug;49(7 Suppl 2):S192-S6.e1. doi: 10.1016/j.jneb.2017.04.024. PMID: 28689557. **-Does not provide any outcome of interest**
531. Murimi M, Dodge CM, Pope J, et al. Factors that influence breastfeeding decisions among special supplemental nutrition program for women, infants, and children participants from Central Louisiana. *J Am Diet Assoc*. 2010 Apr;110(4):624-7. doi: 10.1016/j.jada.2009.12.019. PMID: 20338290. **-No data since 2009**
532. Murthy VH. Food insecurity: A public health issue. *Public Health Reports*. 2016;131(5):655-7. doi: 10.1177/0033354916664154. **-No original data**
533. Musicus A, Hua S, Moran A, et al. Assessing household exposure to front-of-package beverage marketing. *Obesity*. 2020;28(SUPPL 2):7-8. doi: 10.1002/oby.23057. - **Conference/meeting abstract**

534. Myers CR. Do Work Requirements Benefit Medicaid, SNAP, and TANF Recipients? Am J Nurs. 2020 Nov;120(11):22-5. doi: 10.1097/01.naj.0000721924.43351.28 . PMID: 33105219. **-No original data**
535. Nair R, Weber-Gasparoni K, Marshall TA, et al. Factors affecting early childhood caries among WIC-enrolled children in Linn County, Iowa. J Dent Child (Chic). 2010 Sep-Dec;77(3):158-65. PMID: 22044469. **-Does not provide any outcome of interest**
536. Nazarinia M, Afshan S, Yigazu P, et al. Barriers to breastfeeding in brooklyn. Breastfeeding Medicine. 2011;6:S15. doi: 10.1089/bfm.2011.9985. - **Conference/meeting abstract**
537. Needelman H, Schmidt J, Cohen E, et al. Factors Associated with Fetal and Neonatal Deaths as Related to Maternal BMI. Pediatrics. 2020;146(1):150. doi: 10.1542/peds.146.1\_MeetingAbstract. 150. - **Conference/meeting abstract**
538. Nelson CC, Colchamiro R, Perkins M, et al. Racial/Ethnic Differences in the Effectiveness of a Multisector Childhood Obesity Prevention Intervention. Am J Public Health. 2018 Sep;108(9):1200-6. doi: 10.2105/ajph.2018.304511. PMID: 30024810. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
539. Neshteruk C, Savage J, Birch L. Why do WIC mothers choose not to follow current infant feeding recommendations? FASEB Journal. 2013;27. - **Conference/meeting abstract**
540. Newby PK, Peterson KE, Berkey CS, et al. Beverage consumption is not associated with changes in weight and body mass index among low-income preschool children in North Dakota. J Am Diet Assoc. 2004 Jul;104(7):1086-94. doi: 10.1016/j.jada.2004.04.020. PMID: 15215766. **- Does not provide any OUTCOME of interest (Mortality, children development)**
541. Nianogo RA, Wang MC, Basurto-Davila R, et al. Economic evaluation of California prenatal participation in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) to prevent preterm birth. Prev Med. 2019 Jul;124:42-9. doi: 10.1016/j.ypmed.2019.04.011. PMID: 30998955. **-Does not provide any outcome of interest**
542. Nidey N, Tabb KM, Carter KD, et al. Rurality and Risk of Perinatal Depression Among Women in the United States. J Rural Health. 2020 Jan;36(1):9-16. doi: 10.1111/jrh.12401. PMID: 31602705. **-No mention of WIC program**
543. **-No original data**
544. Nobari TZ, Whaley SE, Crespi CM, et al. Widening socio-economic disparities in early childhood obesity in Los Angeles County after the Great Recession. Public Health Nutr. 2018 Aug;21(12):2301-10. doi: 10.1017/s1368980018000666. PMID: 29607794. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

545. Nobari TZ, Whaley SE, Prelip ML, et al. Trends in Socioeconomic Disparities in Obesity Prevalence among Low-Income Children Aged 2-4 Years in Los Angeles County, 2003-2014. *Child Obes.* 2018 May/Jun;14(4):248-58. doi: 10.1089/chi.2017.0264. PMID: 29741920. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
546. Noonan K, Corman H, Reichman NE. Effects of maternal depression on family food insecurity. *Econ Hum Biol.* 2016 Sep;22:201-15. doi: 10.1016/j.ehb.2016.04.004. PMID: 27281498. **-No data since 2009**
547. Nordgren TM, Lyden E, Anderson-Berry A, et al. Omega-3 Fatty Acid Intake of Pregnant Women and Women of Childbearing Age in the United States: Potential for Deficiency? *Nutrients.* 2017;9(3):197. doi: 10.3390/nu9030197. PMID: 122146710. **-No mention of WIC program**
548. Northrup AA. Maternal Attitudes, Subjective Norms and Feeding Practices of Young Children: Columbia University; 2014. **-No original data**
549. Nunnery D, Dharod J. Prenatal food insecurity: How is it related to pregnancy and birth outcomes among low-income women. *FASEB Journal.* 2015;29(1). **- Conference/meeting abstract**
550. Nunnery D. Food security, diet behavior, home food environment, and pregnancy outcomes among pregnant WIC participants: ProQuest Information & Learning; 2017. **- Relevant Systematic Review or Dissertation that applies to the question**
551. Oaks B, Nommsen-Rivers LA, Chantry CJ, et al. Knowledge of breastfeeding recommendations among pregnant women who had attended a WIC breastfeeding class. *FASEB Journal.* 2011;25. **- Conference/meeting abstract**
552. Obeidat BA, Shriver BJ, Roman-Shriver CR. Factors involved in the persistence of overweight among children enrolled in the supplemental food program for women, infants, and children. *Matern Child Health J.* 2010 Mar;14(2):164-73. doi: 10.1007/s10995-009-0457-2. PMID: 19229601. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
553. Ockene JK, Ma Y, Zapka JG, et al. Spontaneous cessation of smoking and alcohol use among low-income pregnant women. *American Journal of Preventive Medicine.* 2002;23(3):150-9. doi: 10.1016/S0749-3797(02)00492-0. **- Does not provide any OUTCOME of interest (Mortality, children development)**
554. Ogu LC, Janakiram J, Hoffman HJ, et al. Hispanic Overweight and Obese Children: Thirty Cases Managed With Standard WIC Counseling or Motivational Interviewing. *Infant, Child, and Adolescent Nutrition.* 2014;6(1):35-43. doi: 10.1177/1941406413510175. **-Does not contain a comparison group or address the association between**

**WIC participation and an outcome of interest**

555. Ohlendorf JM, Robinson K, Garnier-Villarreal M. The impact of maternal BMI, gestational weight gain, and breastfeeding on early childhood weight: Analysis of a statewide WIC dataset. *Prev Med.* 2019 Jan;118:210-5. doi: 10.1016/j.ypmed.2018.11.001. PMID: 30412742. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
556. Okeke JO, Ekanayake RM, Santorelli ML. Effects of a 2014 Statewide Policy Change on Cash-Value Voucher Redemptions for Fruits/Vegetables Among Participants in the Supplemental Nutrition Program for Women, Infants, and Children (WIC). *Matern Child Health J.* 2017 Oct;21(10):1874-9. doi: 10.1007/s10995-017-2339-3. PMID: 28699098. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
557. Olaiya O, Sharma AJ, Tong VT, et al. Impact of the 5As brief counseling on smoking cessation among pregnant clients of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) clinics in Ohio. *Prev Med.* 2015 Dec;81:438-43. doi: 10.1016/j.ypmed.2015.10.011. PMID: 26529063. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
558. Oldfield BJ. Invisible colleagues. *New England Journal of Medicine.* 2015;373(9):792-3. doi: 10.1056/NEJMp1506873. **-No original data**
559. Olgin GK, Bórquez A, Baker P, et al. Preferences and acceptability of law enforcement initiated referrals for people who inject drugs: a mixed methods analysis. *Substance abuse treatment, prevention, and policy.* 2020;15(1):75. doi: 10.1186/s13011-020-00319-w. **-No mention of WIC program**
560. Olson BH, Haider SJ, Vangjel L, et al. A quasi-experimental evaluation of a breastfeeding support program for low income women in Michigan. *Matern Child Health J.* 2010 Jan;14(1):86-93. doi: 10.1007/s10995-008-0430-5. PMID: 19082697. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
561. Olson BH, Horodyski MA, Brophy-Herb H, et al. Health professionals' perspectives on the infant feeding practices of low income mothers. *Matern Child Health J.* 2010 Jan;14(1):75-85. doi: 10.1007/s10995-008-0425-2. PMID: 18982434. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
562. Omar AE. Physiological, psychosocial, behavioral, socio-demographic risk factors and antepartum bed rest associated with gestational age at birth and postpartum depression in high risk

- pregnant women: ProQuest Information & Learning; 2021. - **Relevant Systematic Review or Dissertation that applies to the question**
563. Oniwon O, Tender JA, He J, et al. Reasons for Infant Feeding Decisions in Low-Income Families in Washington, DC. *J Hum Lact.* 2016 Nov;32(4):704-10. doi: 10.1177/0890334416653739. PMID: 27389999. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
564. Orr CJ, Chauvenet C, Ozgun H, et al. Caregivers' Experiences With Food Insecurity Screening and Impact of Food Insecurity Resources. *Clin Pediatr (Phila).* 2019 Dec;58(14):1484-92. doi: 10.1177/0009922819850483. PMID: 31122058. **-Is Qualitative study but does not linked to an outcome of interest**
565. Orr CJ, Ravanbakht S, Flower KB, et al. Associations Between Food Insecurity and Parental Feeding Behaviors of Toddlers. *Acad Pediatr.* 2020 May 31doi: 10.1016/j.acap.2020.05.020. PMID: 32492577. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
566. Osterman MJ, Martin JA, Curtin SC, et al. Newly released data from the revised U.S. birth certificate, 2011. *Natl Vital Stat Rep.* 2013 Dec 10;62(4):1-22. PMID: 24351136. - **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
567. Oza-Frank R, Kachoria R. Breastfeeding status at hospital discharge predicts long-term breastfeeding intensity after GDM pregnancy. *Diabetes.* 2016;65:A355. doi: 10.2337/db16-861-1374. - **Conference/meeting abstract**
568. Oza-Frank R, Kachoria R. Differences in predictors of breastfeeding among women with and without diabetes during pregnancy. *Diabetes.* 2013;62:A416-A7. doi: 10.2337/db13-1395-1677. - **Conference/meeting abstract**
569. Oza-Frank R. Postpartum diabetes testing among women with recent gestational diabetes mellitus history. *Diabetes.* 2012;61:A643. doi: 10.2337/db12-2323-2568. - **Conference/meeting abstract**
570. Ozier AD, Henry BW, Chilton B. Community nutrition service learning at WIC produces a theoretically-based staff and enrollee informed nutrition education handout. *J Nutr Educ Behav.* 2010 May-Jun;42(3 Suppl):S66-8. doi: 10.1016/j.jneb.2009.08.010. PMID: 20399412. **-No original data**
571. Padilla YC, Scott JL, Lopez O. Economic Insecurity and Access to the Social Safety Net among Latino Farmworker Families. *Social Work.* 2014;59(2):157-65. doi: 10.1093/sw/swu013. PMID: 107849784. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

572. Palacios C, Campos M, Gibby C, et al. Effect of a Multi-Site Trial using Short Message Service (SMS) on Infant Feeding Practices and Weight Gain in Low-Income Minorities. J Am Coll Nutr. 2018 Sep-Oct;37(7):605-13. doi: 10.1080/07315724.2018.1454353. PMID: 29708471. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
573. Palacios C, Campos M, Gibby C, et al. Multi-site trial using short mobile messages (SMS) to improve infant feeding practices among participants in the WIC program. FASEB Journal. 2017;31(1). - **Conference/meeting abstract**
574. Palmer SM, Knoblauch ST, Winham DM, et al. Putting knowledge into practice: Low-income women talk about food choice decisions. International Journal of Environmental Research and Public Health. 2020;17(14):1-16. doi: 10.3390/ijerph17145092. **-No mention of WIC program**
575. Pan L, Blanck HM, Galuska DA, et al. Changes in High Weight-for-Length among Infants Enrolled in Special Supplemental Nutrition Program for Women, Infants, and Children during 2010-2018. Child Obes. 2021 May 6doi: 10.1089/chi.2021.0055. PMID: 33960827. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
576. Pan L, Blanck HM, Park S, et al. State-Specific Prevalence of Obesity Among Children Aged 2-4 Years Enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children - United States, 2010-2016. MMWR Morb Mortal Wkly Rep. 2019 Nov 22;68(46):1057-61. doi: 10.15585/mmwr.mm6846a3. PMID: 31751324. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
577. Pan L, May AL, Wethington H, et al. Incidence of obesity among young U.S. children living in low-income families, 2008-2011. Pediatrics. 2013 Dec;132(6):1006-13. doi: 10.1542/peds.2013-2145. PMID: 24276843. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
578. Pan L, McGuire LC, Blanck HM, et al. Racial/ethnic differences in obesity trends among young low-income children. Am J Prev Med. 2015 May;48(5):570-4. doi: 10.1016/j.amepre.2014.11.009. PMID: 25891056. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
579. Pan L, Park S, Scanlon KS, et al. Trends in severe obesity among 23 million U.S. children aged 2 to 4 years who enrolled in WIC D United States, 2000-2014. Annals of Epidemiology. 2017;27(8):528. - **Conference/meeting abstract**
580. Panzera AD, Bryant CA, Hawkins F, et al. Mapping a WIC Mother's Journey: A Preliminary Analysis.



- Social Marketing Quarterly. 2017;23(2):137-54. doi: 10.1177/1524500417692526. **-Does not provide any outcome of interest**
581. Paolicelli C, Berman D, Owens T, et al. Breastfeeding and Complementary Feeding Patterns Among Women Enrolled in WIC: WIC Infant and Toddler Feeding Practices Study-2. Breastfeed Med. 2017 Oct;12(8):482-6. doi: 10.1089/bfm.2017.0118. PMID: 28829156. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
582. Paolicelli C, Weinfield N, Whaley S. Hospital Breastfeeding Experiences of Women Receiving WIC Benefits: Findings from the WIC Infant and Toddler Feeding Practices Study-2. Journal of the Academy of Nutrition & Dietetics. 2017;117(10):A140-A. doi: 10.1016/j.jand.2017.08.079. PMID: 125286966. - **Conference/meeting abstract**
583. Parasuraman S, Lebrun-Harris L, Jones J. Breastfeeding initiation, duration, and exclusivity among WIC-eligible populations. Health Services Research. 2020;55(SUPPL 1):30-1. doi: 10.1111/1475-6773.13366. - **Conference/meeting abstract**
584. Park K, Kersey M, Geppert J, et al. Household food insecurity is a risk factor for iron-deficiency anaemia in a multi-ethnic, low-income sample of infants and toddlers. Public Health Nutr. 2009 Nov;12(11):2120-8. doi: 10.1017/s1368980009005540. PMID: 19405987. **-No data since 2009**
585. Parker CG. Diet quality of American young children: Nova Science Publishers, Inc.; 2010. **-No original data**
586. Parker HW, Tovar A, McCurdy K, et al. Associations between pre-pregnancy BMI, gestational weight gain, and prenatal diet quality in a national sample. PLoS One. 2019;14(10):e0224034. doi: 10.1371/journal.pone.0224034. PMID: 31626677. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
587. Parker MG, Hwang SS, Forbes ES, et al. Use of the Theory of Planned Behavior Framework to Understand Breastfeeding Decision-Making Among Mothers of Preterm Infants. Breastfeed Med. 2020 Jul 16doi: 10.1089/bfm.2020.0127. PMID: 32678988. **-No mention of WIC program**
588. Parrilla-Rodríguez AM, Bruno-Lozano N, Reyes-Ortiz VE, et al. BFHI in puerto rico: Barriers identified by peer counselors of the WIC program. Breastfeeding Medicine. 2013;8:S-9. doi: 10.1089/bfm.2013.9982. - **Conference/meeting abstract**
589. Parti U, Lakshmanan A, Song A, et al. Enrollment in wic is associated with positive growth and developmental outcomes in preterm infants at a safety net hospital after discharge. Journal of Investigative Medicine. 2019;67(1):256. doi: 10.1136/jim-2018-000939.440. - **Conference/meeting abstract**

590. Pate BL. Effectiveness of Web-based programs in improving breastfeeding self-efficacy: University of Arkansas for Medical Sciences; 2009. - **Relevant Systematic Review or Dissertation that applies to the question**
591. Patel K, Bakk J, Pensak M, et al. Changes in short interpregnancy interval rates and association with state-level access to contraception. *Obstetrics and Gynecology*. 2020;135:103S-4S. - **Conference/meeting abstract**
592. Pawlak R, Colby S, Herring J. Beliefs, benefits, barriers, attitude, intake and knowledge about peanuts and tree nuts among WIC participants in eastern North Carolina. *Nutr Res Pract*. 2009 Fall;3(3):220-5. doi: 10.4162/nrp.2009.3.3.220. PMID: 20090888. -**Does not provide any outcome of interest**
593. Payán DD, Díaz Rios LK, Ramírez AS, et al. Structural Barriers Influencing Food Insecurity, Malnutrition, and Health Among Latinas During and After COVID-19: Considerations and Recommendations. *J Acad Nutr Diet*. 2021 May;121(5):837-43. doi: 10.1016/j.jand.2021.01.005. PMID: 33568334. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
594. Penfield CA, Wing DA, Oakes M, et al. Maternal education level and risk of adverse perinatal complications in adolescent pregnancies. *Reproductive Sciences*. 2018;25(1):88A. - **Conference/meeting abstract**
595. Perez MJ, Chang JJ, Temming LA, et al. Driving Factors of Preterm Birth Risk in Adolescents. *AJP Reports*. 2020;10(3):E247-E52. doi: 10.1055/s-0040-1715164. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
596. Pérez-Escamilla R, Song DS, Taylor CA, et al. Place of residence modifies the association between acculturation and dietary tools knowledge among Latina WIC participants: a multi-state study. *J Immigr Minor Health*. 2011 Apr;13(2):299-308. doi: 10.1007/s10903-010-9360-6. PMID: 20549357. -**No data since 2009**
597. Perry DF, Le HN, Villamil CA, et al. Integrating Perinatal Depression Screening Into WIC at a Federally Qualified Health Center. *Prog Community Health Partnersh*. 2015 Summer;9(2):253-9. doi: 10.1353/cpr.2015.0035. PMID: 26412766. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
598. Peterman J, Cordeiro L. Healthful cultural foods and safety nets: Experiences of immigrant and Puerto Rican families in Massachusetts. *FASEB Journal*. 2014;28(1). - **Conference/meeting abstract**
599. Petrov ME, Vander Wyst KB, Whisner CM, et al. Relationship of Sleep Duration and Regularity with Dietary Intake Among Preschool-Aged Children with Obesity from Low-Income Families. *J Dev Behav Pediatr*. 2017 Feb/Mar;38(2):120-8. doi: 10.1097/dbp.0000000000000369.

- PMID: 28106613. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
600. Phelan S, Hagobian T, Brannen A, et al. Effect of an Internet-Based Program on Weight Loss for Low-Income Postpartum Women: A Randomized Clinical Trial. *Jama*. 2017 Jun 20;317(23):2381-91. doi: 10.1001/jama.2017.7119. PMID: 28632867. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
601. Phelan S, Smith K, Steele J, et al. What type of weight loss program do postpartum women want? Treatment preferences of postpartum women in two community settings. *Californian Journal of Health Promotion*. 2010;8(1):22-31. doi: 10.32398/cjhp.v8i1.2027. PMID: 104987151. **-No data since 2009**
602. Phelan ST, Roaché AM. OB/GYN involvement in WIC efforts breeds success. *Contemporary Ob/Gyn*. 2017;2017(November). **-No original data**
603. Pia Chaparro M, Anderson C, Crespi CM, et al. Higher rates of breastfeeding mediate the association between the 2009 WIC food package change and BMI Z-score at age 4. *Circulation*. 2019;139doi: 10.1161/circ.139.suppl\_1.P212. **- Conference/meeting abstract**
604. Pineros-Leano M, Tabb K, Liechty J, et al. Feeding decision-making among first generation Latinas living in non-metropolitan and small metro areas. *PLoS One*. 2019;14(3):e0213442. doi: 10.1371/journal.pone.0213442. PMID: 30883597. **-No mention of WIC program**
605. Pineros-Leano M, Tabb KM, Simonovich SD, et al. Racial Differences in Breastfeeding Initiation Among Participants in a Midwestern Public Health District. *Health Equity*. 2018;2(1):296-303. doi: 10.1089/heq.2018.0016. PMID: 30364880. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
606. Pino LD. Risk factors and suspected child maltreatment: University of Miami; 2010. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
607. Ploeg MV, Mancino L, Todd JF, et al. Where do Americans usually shop for food and how do they travel to get there? Initial findings from the National Household Food Acquisition and Purchase Survey. *Food Shopping Patterns and Geographic Access to Food: Comparisons and Data*. Nova Science Publishers, Inc.; 2015:1-31. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
608. Pollard D, Guill M. The relationship between baseline self-efficacy and breastfeeding duration. *Southern Online Journal of Nursing Research*. 2009;9(4):8p-p. PMID: 105281922. **- No data since 2009**

609. Pollard DL. Impact of a feeding log on breastfeeding duration and exclusivity. *Matern Child Health J*. 2011 Apr;15(3):395-400. doi: 10.1007/s10995-010-0583-x. PMID: 20177755. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
610. Ponza M, Devaney B, Ziegler P, et al. Nutrient intakes and food choices of infants and toddlers participating in WIC. *Journal of the American Dietetic Association*. 2004;104(SUPPL. 1):S71-S9. doi: 10.1016/j.jada.2003.10.018. **- Does not provide any OUTCOME of interest (Mortality, children development)**
611. Pooler J, Gleason SF. Comparison of WIC benefit redemptions in Michigan indicates higher utilization among Arab American families. *J Nutr Educ Behav*. 2014 May-Jun;46(3 Suppl):S45-52. doi: 10.1016/j.jneb.2014.02.019. PMID: 24809996. **-Does not provide any outcome of interest**
612. Pooler J, Perry DF, Ghandour RM. Prevalence and risk factors for postpartum depressive symptoms among women enrolled in WIC. *Matern Child Health J*. 2013 Dec;17(10):1969-80. doi: 10.1007/s10995-013-1224-y. PMID: 23329168. **-No data since 2009**
613. Pounds L, Shostrom V. Analyzing Factors That Impact Breastfeeding Duration in the Postpartum Period: A Secondary Analysis of PRAMS Data. *Breastfeed Med*. 2018 Jun;13(5):335-40. doi: 10.1089/bfm.2018.0020. PMID: 29708765. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
614. Pounds L. A phenomenological study of low-income women who balance working full-time outside the home and exclusive breastfeeding: ProQuest Information & Learning; 2015. **-Other: Dissertation**
615. Powell R, Davis M, Anderson AK. A qualitative look into mother's breastfeeding experiences. *Journal of Neonatal Nursing*. 2014;20(6):259-65. doi: 10.1016/j.jnn.2014.04.001. **- No mention of WIC program**
616. Prado B, McMahan S, Mouttapa M, et al. An Educational Telenovela (Soap Opera) Approach to Promote Breastfeeding Among U.S. Latinas. *Californian Journal of Health Promotion*. 2012;10(S1):67-73. PMID: 104421236. **-Does not provide any outcome of interest**
617. Pugh LC, Serwint JR, Frick KD, et al. A randomized controlled community-based trial to improve breastfeeding rates among urban low-income mothers. *Acad Pediatr*. 2010 Jan-Feb;10(1):14-20. doi: 10.1016/j.acap.2009.07.005. PMID: 19854119. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
618. Puma JE, Thompson D, Baer K, et al. Enhancing Periconceptional Health by Targeting Postpartum Mothers at Rural WIC Clinics. *Health Promot Pract*. 2018 May;19(3):390-9. doi: 10.1177/1524839917699553. PMID: 28438036. **-Does not contain**

**a comparison group or address the association between WIC participation and an outcome of interest**

619. Quesada C, Lora KR, Wakefield DB, et al. Latino and African American parents of preschool children differ in their feeding practices. *FASEB Journal*. 2011;25. -

**Conference/meeting abstract**

620. Raburn LM, Helvey JJ, Kavanagh KF. Voices of women of low SES: Overcoming breastfeeding barriers. *FASEB Journal*. 2011;25. -

**Conference/meeting abstract**

621. Racine EF, Frick K, Guthrie JF, et al. Individual net-benefit maximization: a model for understanding breastfeeding cessation among low-income women. *Matern Child Health J*. 2009 Mar;13(2):241-9. doi: 10.1007/s10995-008-0337-1. PMID: 18357417. **-No data since 2009**

622. Rasmussen KM, Pérez-Escamilla R, Baker SS. Fruit Juice and Fruit in the Special Supplemental Nutrition Program for Women, Infants, and Children Food Packages. *JAMA Pediatr*. 2017 Dec 1;171(12):1229-30. doi: 10.1001/jamapediatrics.2017.3559. PMID: 29049496. **-No original data**

623. Ratigan AR, Lindsay S, Lemus H, et al. Factors associated with continued participation in a matched monetary incentive programme at local farmers' markets in low-income neighbourhoods in San Diego, California. *Public Health Nutr*. 2017 Oct;20(15):2786-95. doi: 10.1017/s1368980017001549. PMID: 28756784. **-Does not contain a comparison group or address the**

**association between WIC participation and an outcome of interest**

624. Ratnasiri AWG, Lakshminrusimha S, Dieckmann RA, et al. Maternal and infant predictors of infant mortality in California, 2007-2015. *PLoS One*. 2020;15(8):e0236877. doi: 10.1371/journal.pone.0236877. PMID: 32760136. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

**association between WIC participation and an outcome of interest**

625. Ratnasiri AWG, Parry SS, Arief VN, et al. Temporal trends, patterns, and predictors of preterm birth in California from 2007 to 2016, based on the obstetric estimate of gestational age. *Matern Health Neonatol Perinatol*. 2018;4:25. doi: 10.1186/s40748-018-0094-0. PMID: 30564431. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

626. Ray EB, Holben DH, Holcomb Jr JP. Food security status and produce intake behaviors, health status, and diabetes risk among women with children living on a Navajo reservation. *Journal of Hunger and Environmental Nutrition*. 2012;7(1):91-100. doi: 10.1080/19320248.2012.649670. **-No data since 2009**

627. Reat A, Crixell S, Von Bank J, et al. Average infant formula and breastmilk intake among WIC infants reflects food package changes. *FASEB Journal*. 2014;28(1). - **Conference/meeting abstract**

628. Reat AM, Crixell SH, Friedman BJ, et al. Comparison of Food Intake Among Infants and Toddlers Participating in a South Central Texas WIC Program Reveals Some Improvements After WIC Package Changes. *Matern Child Health J.* 2015 Aug;19(8):1834-41. doi: 10.1007/s10995-015-1697-y. PMID: 25656719. – **Other: No adjusted data**
629. Reeder JA, Joyce T, Sibley K, et al. Telephone peer counseling of breastfeeding among WIC participants: a randomized controlled trial. *Pediatrics.* 2014 Sep;134(3):e700-9. doi: 10.1542/peds.2013-4146. PMID: 25092936. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
630. Reeder JA. Nutrition Educators and Global Food Policy. *J Nutr Educ Behav.* 2016 Apr;48(4):233. doi: 10.1016/j.jneb.2016.02.008. PMID: 27059310. **-No original data**
631. Reeder JA. Weighing in on Weight. *J Nutr Educ Behav.* 2015 Sep-Oct;47(5):403. doi: 10.1016/j.jneb.2015.07.005. PMID: 26363935. – **Conference/meeting abstract**
632. Reeves EA, Woods-Giscombé CL. Infant-feeding practices among African American women: social-ecological analysis and implications for practice. *J Transcult Nurs.* 2015 May;26(3):219-26. doi: 10.1177/1043659614526244. PMID: 24810518. **-No original data**
633. Reifsnider E, McCormick DP, Cullen KW, et al. Randomized Controlled Trial to Prevent Infant Overweight in a High-Risk Population. *Acad Pediatr.* 2018 Apr;18(3):324-33. doi: 10.1016/j.acap.2017.12.007. PMID: 29277462. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
634. Reifsnider EA, Militello L. Reducing childhood obesity among WIC recipients. *Communicating Nursing Research.* 2012 2012 Spring;45:442-. PMID: 107933829. **-No original data**
635. Reno K, Clemm C, Kaider AS, et al. Perspectives of food insecurity in CF. *Pediatric Pulmonology.* 2018;53:454. doi: 10.1002/ppul.24152. – **Conference/meeting abstract**
636. Reno R, Barnhart S, Gabbe PT. A Critical Inquiry of Breastfeeding Attitudes, Barriers, and Experiences of African American Women living in Poverty. *Journal of Poverty.* 2018;22(6):518-36. doi: 10.1080/10875549.2018.1496374. – **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
637. Rethy JA, Gallo S, Doig AC, et al. Sociodemographic predictors of exclusive breast-feeding among low-income women attending a Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) programme. *Public Health Nutr.* 2019 Jun;22(9):1667-74. doi: 10.1017/s1368980019000119. PMID: 30803466. **-Does not contain a comparison group or address the**

- association between WIC participation and an outcome of interest**
638. Reuben JD, Shaw DS, Brennan LM, et al. A family-based intervention for improving children's emotional problems through effects on maternal depressive symptoms. *J Consult Clin Psychol.* 2015 Dec;83(6):1142-8. doi: 10.1037/ccp0000049. PMID: 26302250. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
639. Rex SM, Trabulsi J, Baker S, et al. Food Purchasing Behaviors of WIC Participants: What Non-WIC Eligible Foods Items Are Being Purchased. *Am J Health Promot.* 2020 Mar;34(3):307-10. doi: 10.1177/0890117119892765. PMID: 31854196. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
640. Reyes NR, Klotz AA, Herring SJ. A qualitative study of motivators and barriers to healthy eating in pregnancy for low-income, overweight, African-American mothers. *J Acad Nutr Diet.* 2013 Sep;113(9):1175-81. doi: 10.1016/j.jand.2013.05.014. PMID: 23871106. **-No mention of WIC program**
641. Reynolds MM, Beagley M, Fox AM, et al. Is less more? Examining the relationship between food assistance generosity and childhood obesity. *Journal of Clinical and Translational Science.* 2018;83-4. doi: 10.1017/cts.2018.290. **- Conference/meeting abstract**
642. Rhoades ER, Chris Carey J, Jacobs BK, et al. The health of American Indian and Alaska native women, infants and children. *Maternal and Child Health Journal.* 2008;12(SUPPL. 1):S2-S3. doi: 10.1007/s10995-008-0395-4. **- No original data (opinion, descriptive data, letters, editorial, commentary)**
643. Ribar DC, Zapata D. Food assistance and family routines in three American Cities. *Review of Economics of the Household.* 2017;15(1):223-38. doi: 10.1007/s11150-014-9270-9. **-No data since 2009**
644. Rich SS, DiMarco NM, Huettig C, et al. Perceptions of health status and play activities in parents of overweight hispanic toddlers and preschoolers. *Family and Community Health.* 2005;28(2):130-41. doi: 10.1097/00003727-200504000-00005. **- Does not provide any OUTCOME of interest (Mortality, children development)**
645. Richards R, Merrill RM, Baksh L, et al. Maternal health behaviors and infant health outcomes among homeless mothers: U.S. Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) 2000-2007. *Prev Med.* 2011 Jan;52(1):87-94. doi: 10.1016/j.ypmed.2010.10.010. PMID: 21050871. **-No data since 2009**
646. Richardson AS, Arsenault JE, Cates SC, et al. Perceived stress, unhealthy eating behaviors, and severe obesity in low-income women. *Nutr J.* 2015 Dec 3;14:122. doi: 10.1186/s12937-

- 015-0110-4. PMID: 26630944. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
647. Richardson AS, Ghosh-Dastidar M, Beckman R, et al. Can the introduction of a full-service supermarket in a food desert improve residents' economic status and health? *Ann Epidemiol.* 2017 Dec;27(12):771-6. doi: 10.1016/j.annepidem.2017.10.011. PMID: 29198367. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
648. Ricketts S, Klingler G, Schwalberg R. Game change in Colorado: widespread use of long-acting reversible contraceptives and rapid decline in births among young, low-income women. *Perspect Sex Reprod Health.* 2014 Sep;46(3):125-32. doi: 10.1363/46e1714. PMID: 24961366. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
649. Ridberg RA, Marpadga S, Akers MM, et al. Fruit and Vegetable Vouchers in Pregnancy: Preliminary Impact on Diet & Food Security. *Journal of Hunger and Environmental Nutrition.* 2020doi: 10.1080/19320248.2020.1778593. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
650. Ridberg RA. Fruit and Vegetable Vouchers in Pregnancy: Preliminary Impact on Diet & Food Security. *Journal of hunger & environmental nutrition.* 2021 2021-03-04;v. 16(no. 2):pp. 149-63-2021 v.16 no.2. doi: 10.1080/19320248.2020.1778593. PMID: 7331086. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
651. Riley B, Schoeny M, Rogers L, et al. Barriers to Human Milk Feeding at Discharge of Very Low-Birthweight Infants: Evaluation of Neighborhood Structural Factors. *Breastfeed Med.* 2016 Sep;11(7):335-42. doi: 10.1089/bfm.2015.0185. PMID: 27347851. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
652. Ritchie LD, Whaley SE, Crocker NJ. Satisfaction of California WIC participants with food package changes. *J Nutr Educ Behav.* 2014 May-Jun;46(3 Suppl):S71-8. doi: 10.1016/j.jneb.2014.01.009. PMID: 24810000. **-Is Qualitative study but does not linked to an outcome of interest**
653. Ritchie LD, Whaley SE, Spector P, et al. Favorable impact of nutrition education on California WIC families. *J Nutr Educ Behav.* 2010 May-Jun;42(3 Suppl):S2-10. doi: 10.1016/j.jneb.2010.02.014. PMID: 20399405. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
654. Rivera AC. Impact and process evaluation of prenatal WIC on



maternal and infant outcomes:  
ProQuest Information & Learning;  
2009. **-No data since 2009**

655. Robert R, Roess A, Cleaves E, et al. An innovative, mobile-health enhanced, peer-counseling program to improve breastfeeding among low-income, minority populations in Washington, DC. *Annals of Global Health*. 2017;83(1):200. -  
**Conference/meeting abstract**
656. Robinson C. Family Composition and the Benefits of Participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). *Eastern Economic Journal*. 2016;42(2):232-51. doi: 10.1057/eej.2014.43. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
657. Robinson C. Younger Siblings Can Be Good for Your Health: An Examination of Spillover Benefits from the Supplemental Nutrition Program for Women, Infants, and Children (WIC). *Journal of Family and Economic Issues*. 2013;34(2):172-84. doi: 10.1007/s10834-012-9325-0. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
658. Robinson SL, Sundaram R, Putnick DL, et al. Predictors of Age at Juice Introduction and Associations with Subsequent Beverage Intake in Early and Middle Childhood. *J Nutr*. 2021 Sep 6doi: 10.1093/jn/nxab260. PMID: 34486676. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
659. Rojhani A, Ouyang P, Gullon-Rivera A, et al. Dietary Quality of Pregnant Women Participating in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Int J Environ Res Public Health*. 2021 Aug 7;18(16)doi: 10.3390/ijerph18168370. PMID: 34444120. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
660. Rojjanasrirat W, Sousa VD. Perceptions of breastfeeding and planned return to work or school among low-income pregnant women in the USA. *J Clin Nurs*. 2010 Jul;19(13-14):2014-22. doi: 10.1111/j.1365-2702.2009.03152.x. PMID: 20920027. **-No data since 2009**
661. Rosal MC, Lemon SC, Nguyen OH, et al. Translation of the diabetes prevention program lifestyle intervention for promoting postpartum weight loss among low-income women. *Transl Behav Med*. 2011 Dec;1(4):530-8. doi: 10.1007/s13142-011-0069-4. PMID: 24073075. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
662. Rose-Jacobs R, Fiore JG, Ettinger de Cuba S, et al. Children with Special Health Care Needs, Supplemental Security Income, and Food Insecurity. *J Dev Behav Pediatr*. 2016 Feb-Mar;37(2):140-7.

- doi:  
10.1097/dbp.0000000000000260.  
PMID: 26836641. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
663. Rosenberg TJ, Alperen JK, Chiasson MA. Why do WIC participants fail to pick up their checks? An urban study in the wake of welfare reform. *American Journal of Public Health*. 2003;93(3):477-81. doi: 10.2105/AJPH.93.3.477. PMID: 106788137. **- Does not provide any OUTCOME of interest (Mortality, children development)**
664. Rosen-Carole C, Halterman J, Baldwin CD, et al. Prenatal Provider Breastfeeding Toolkit: Results of a Pilot to Increase Women's Prenatal Breastfeeding Support, Intentions, and Outcomes. *J Hum Lact*. 2021 Apr 6:8903344211008797. doi: 10.1177/08903344211008797. PMID: 33823702. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
665. Rosenthal A, Oliveira S, Madubuko U, et al. Cultural perceptions of breastfeeding are major determinants of breastfeeding habits. *Pediatrics*. 2018;142(1)doi: 10.1542/peds.142.1\_MeetingAbstract.685. **- Conference/meeting abstract**
666. Rosenthal A, Oliveira S, Madubuko U, et al. Infant feeding practices among families in inner city, low socioeconomic communities. *Journal of Pediatric Gastroenterology and Nutrition*. 2017;65:S192-S3. doi: 10.1097/MPG.0000000000001805. **- Conference/meeting abstract**
667. Rowan MT, Palmer A, Gittelsohn J. Improving the food environment in baltimore city through policy change. *FASEB Journal*. 2011;25. **- Conference/meeting abstract**
668. Rozga MR, Benton PA, Kerver JM, et al. An Integrated Model of Breastfeeding Peer Counseling Support is Feasible and Associated with Improved Exclusive Breastfeeding. *Matern Child Health J*. 2016 Dec;20(12):2589-98. doi: 10.1007/s10995-016-2086-x. PMID: 27423234. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
669. Sadegh-Nobari TZ. Socioeconomic disparities, unaffordable housing and obesity among low-income preschool-aged children in Los Angeles: ProQuest Information & Learning; 2017. **-Relevant Systematic Review or Dissertation that applies to the question**
670. Saitone TL, McLaughlin PW. Women, Infants and Children (WIC) Program redemptions at California farmers' markets: Making the program work for farmers and participants. *Renewable Agriculture and Food Systems*. 2018;33(4):344-6. doi: 10.1017/S1742170517000102. **- Does not provide any outcome of interest**

671. Salm Ward TC, Kanu FA, Anderson AK. Trends and Factors Associated with Breastfeeding and Infant Sleep Practices in Georgia. *Journal of Community Health*. 2018;43(3):496-507. doi: 10.1007/s10900-017-0442-4. PMID: 129323022. **-No mention of WIC program**
672. Salm Ward TC, Robb SW, Kanu FA. Prevalence and Characteristics of Bed-Sharing Among Black and White Infants in Georgia. *Matern Child Health J*. 2016 Feb;20(2):347-62. doi: 10.1007/s10995-015-1834-7. PMID: 26525561. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
673. Sana H. Birth outcomes of immigrant and native-born Hispanic women: Role of prenatal care utilization and participation in the Women, Infants and Children (WIC) program: ProQuest Information & Learning; 2016. - **Other: Full text not available**
674. Sandel M, Cutts D, Meyers A, et al. Co-enrollment for Child Health: How Receipt and Loss of Food and Housing Subsidies Relate to Housing Security and Statutes for Streamlined, Multi-Subsidy Application. *Journal of Applied Research on Children*. 2014;5(2):1-12. PMID: 100846528. **-Does not provide any outcome of interest**
675. Sangvai AC. Food insecurity screening and intervention in a pediatric CF center. *Pediatric Pulmonology*. 2019;54:478. doi: 10.1002/ppul.22495. - **Conference/meeting abstract**
676. Santorelli ML, Okeke JO. Evaluating Community Measures of Healthy Food Access. *J Community Health*. 2017 Oct;42(5):991-7. doi: 10.1007/s10900-017-0346-3. PMID: 28417432. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
677. Savage JS, Hermann N, Marini M, et al. WIC mothers' feeding practices and perceptions of dietary guidance. *Obesity*. 2011;19:S67. doi: 10.1038/oby.2011.222. - **Conference/meeting abstract**
678. Savage JS, Neshteruk CD, Balantekin KN, et al. Low-Income Women's Feeding Practices and Perceptions of Dietary Guidance: A Qualitative Study. *Matern Child Health J*. 2016 Dec;20(12):2510-7. doi: 10.1007/s10995-016-2076-z. PMID: 27465059. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
679. Sawyer-Morris G, Grajeda S, Tracy T, et al. Between-and within-group differences in fruit and vegetable purchases, consumption, and bmi among hispanic farmers' market shoppers who use snap. *International Journal of Environmental Research and Public Health*. 2021;18(18)doi: 10.3390/ijerph18189923. **-No mention of WIC program**
680. Schindler-Ruwisch J. Factors affecting breastfeeding initiation and duration among WIC recipients in Washington, DC: ProQuest Information & Learning; 2018. -

**Relevant Systematic Review or Dissertation that applies to the question**

681. Schlundt D, Briley C, Canada B, et al. Availability of Low-Fat Milk and Produce in Small and Mid-Sized Grocery Stores After 2014 WIC Final Rule Changes, Tennessee. *Prev Chronic Dis*. 2017 Aug 24;14:E70. doi: 10.5888/pcd14.170008. PMID: 28840823. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
682. Schonberg MA, Shaw DS. Risk Factors for Boy's Conduct Problems in Poor and Lower-Middle-Class Neighborhoods. *Journal of Abnormal Child Psychology*. 2007 10/01;35(5):759-72. PMID: EJ774735. **- Does not provide any OUTCOME of interest (Mortality, children development)**
683. Schramm WF. Prenatal participation in WIC related to Medicaid costs for Missouri newborns: 1982 update. *Public Health Reports*. 1986;101(6):607-15. **-Other: Pre-2000 data for mortality and child development outcomes**
684. Schramm WF. Prenatal participation in WIC related to Medicaid costs for Missouri newborns: 1982 update. *Public Health Reports*. 1986;101(6):607-15. **- Other: Pre-2000 data**
685. Schwartz JD, Theriot JA, Franco SM, et al. Women, infant & children nutrition program housed within a pediatric clinic: Is iron deficiency anemia impacted? *Journal of Investigative Medicine*. 2013;61(2):510-1. doi: 10.231/JIM.0b013e3182820c55. **- Conference/meeting abstract**
686. See H, Smith-Gagen J, Hollen R, et al. Pragmatic Effectiveness of the *Loving Support Peer Counseling* Program to Increase Breastfeeding Duration Among Nevada WIC Participants. *Clinical Lactation*. 2018;9(2):72-7. doi: 10.1891/2158-0782.9.2.72. PMID: 130010452. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
687. Seidel M, Brink L, Hamilton M, et al. Increasing WIC Farmers' Market Nutrition Program Redemption Rates: Results and Policy Recommendations. *Prog Community Health Partnersh*. 2018;12(4):431-9. doi: 10.1353/cpr.2018.0068. PMID: 30739897. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
688. Sekhobo JP. Estimation of WIC effects in multilevel, cross-sector obesity prevention interventions. *Obesity (Silver Spring)*. 2017 Jul;25(7):1157-8. doi: 10.1002/oby.21891. PMID: 28653503. **-No original data**
689. Sergeev AV, Nyirati CM. Gestational hypertension in minorities: Can racial and ethnic disparities be attributed to socio-economic status? *Circulation*.

- 2012;125(10). -  
**Conference/meeting abstract**
690. Sergeev AV, Nyirati CM. Maternal hypertension and low birth weight: Do socio-economic and racial/ethnic disparities matter? *Circulation*. 2011;124(21). -  
**Conference/meeting abstract**
691. Seth JG, Isbell MG, Atwood RD, et al. Addressing language barriers in client-centered health promotion: lessons learned and promising practices from Texas WIC. *Health Promot Pract*. 2015 May;16(3):320-8. doi: 10.1177/1524839914560404. PMID: 25445982. - **Descriptive research on WIC implementation, operations, and program costs**
692. Seth JG, Isbell MG, Hovis A, et al. Special Supplemental Nutrition Program for Women, Infants, and Children participants perceive that Zobey's Jungle Jive promotes healthy eating and physical activity for their preschool-aged children. *J Nutr Educ Behav*. 2014 May-Jun;46(3 Suppl):S93-6. doi: 10.1016/j.jneb.2014.02.004. PMID: 24810003. -**No data since 2009**
693. Shamberger RJ. Autism associated with B-vitamin deficiency linked to sugar intake and alcohol consumption. *Journal of Intellectual Disability - Diagnosis and Treatment*. 2015;3(1):7-12. doi: 10.6000/2292-2598.2015.03.01.2. -  
**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
694. Shamberger RJ. Autism rates associated with nutrition and the WIC program. *J Am Coll Nutr*. 2011 Oct;30(5):348-53. doi: 10.1080/07315724.2011.10719978. PMID: 22081621. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
695. Sharpe PA, Liese AD, Bell BA, et al. Household food security and use of community food sources and food assistance programs among food shoppers in neighborhoods of low income and low food access. *Journal of Hunger and Environmental Nutrition*. 2018;13(4):482-96. doi: 10.1080/19320248.2017.1364188. -  
**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
696. Sherman A, DeBot B, Huang CC. Boosting Low-Income Children's Opportunities to Succeed Through Direct Income Support. *Acad Pediatr*. 2016 Apr;16(3 Suppl):S90-7. doi: 10.1016/j.acap.2016.01.008. PMID: 27044709. -**No mention of WIC program**
697. Shim JE, Kim J, Heiniger JB. Breastfeeding duration in relation to child care arrangement and participation in the special supplemental nutrition program for women, infants, and children. *J Hum Lact*. 2012 Feb;28(1):28-35. doi: 10.1177/0890334411424728. PMID: 22267317. -**No data since 2009**
698. Shin CN, Reifsnider E, McClain D, et al. Acculturation, Cultural Values, and Breastfeeding in Overweight or Obese, Low-Income, Hispanic Women at 1 Month

- Postpartum. J Hum Lact. 2018 May;34(2):358-64. doi: 10.1177/0890334417753942. PMID: 29543552. **-Does not provide any outcome of interest**
699. Shin CN, Reifsnider E, McClain D. Acculturation, Cultural Values, and Breastfeeding in Overweight or Obese, Low-Income, Hispanic Women at 1 Month Postpartum. Journal of human lactation. 2018;34(2):358-64. doi: 10.1177/0890334417753942. PMID: CN-02081944. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
700. Shin D, Song W. Prepregnancy body mass index is an independent risk factor for pregnancy complications and poor birth outcomes. FASEB Journal. 2015;29(1). - **Conference/meeting abstract**
701. Shinn L, Tangney C, Mullen M, et al. Infant feeding practices in the first six months of life and subsequent growth performance. FASEB Journal. 2017;31(1). - **Conference/meeting abstract**
702. Shinn LM, Tangney CC, Busche C, et al. Demographic Correlates of Infant Feeding Practices and Growth Performance in the First Year of Life. Int J Pediatr. 2018;2018:6569204. doi: 10.1155/2018/6569204. PMID: 30364029. **-No data since 2009**
703. Short E, Kohler LN, Taren D, et al. Diet Quality Following Food Pantry Visit Differs by Ethnicity. Journal of Hunger and Environmental Nutrition. 2020doi: 10.1080/19320248.2020.1860849. - **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
704. Shree R, Caughey A, Chandrasekaran S. Short interpregnancy interval increases the risk of early preterm premature rupture of membranes. American Journal of Obstetrics and Gynecology. 2016;214(1):S291. - **No mention of WIC program**
705. Shree R, Caughey AB, Chandrasekaran S. Short interpregnancy interval increases the risk of preterm premature rupture of membranes and early delivery. J Matern Fetal Neonatal Med. 2018 Nov;31(22):3014-20. doi: 10.1080/14767058.2017.1362384. PMID: 28764570. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
706. Shviraga BA. A critical ethnographic study of the cultural values, beliefs, and practices of recently immigrated Mexican primiparas regarding infant feeding with a focus on exclusive breastfeeding: University of Colorado Health Sciences Center; 2011. **-Relevant Systematic Review or Dissertation that applies to the question**
707. Si X, Leonard T. AGING OUT OF WOMEN INFANTS AND CHILDREN: AN INVESTIGATION OF THE COMPENSATION EFFECT OF

PRIVATE NUTRITION ASSISTANCE PROGRAMS. Economic Inquiry. 2020;58(1):446-61. doi: 10.1111/ecin.12842. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

708. Siddiqi KA, Haider MR, Demir I, et al. Are mother's behavior, health status, and birth experience associated with low birth weight in south carolina? Evidence from PRAMS, 2004-2013. Value in Health. 2018;21:S137. - **Conference/meeting abstract**
709. Silfee VJ, Lopez-Cepero A, Lemon SC, et al. Adapting a Behavioral Weight Loss Intervention for Delivery via Facebook: A Pilot Series Among Low-Income Postpartum Women. JMIR Form Res. 2018 Sep 10;2(2):e18. doi: 10.2196/formative.9597. PMID: 30684423. **-Does not provide any outcome of interest**
710. Simonovich SD. An examination of the relationship between household food insecurity and WIC participation: ProQuest Information & Learning; 2016. **-Relevant Systematic Review or Dissertation that applies to the question**
711. Singleton CR, Baskin M, Levitan EB, et al. Farm-to-Consumer Retail Outlet Use, Fruit and Vegetable Intake, and Obesity Status among WIC Program Participants in Alabama. Am J Health Behav. 2016 Jul;40(4):446-54. doi: 10.5993/ajhb.40.4.6. PMID: 27338991. **-Does not contain a comparison group or address the association between WIC**

**participation and an outcome of interest**

712. Singleton CR, Baskin M, Levitan EB, et al. Perceived Barriers and Facilitators of Farm-to-Consumer Retail Outlet Use Among Participants of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in Alabama. J Hunger Environ Nutr. 2017;12(2):237-50. doi: 10.1080/19320248.2016.1157550. PMID: 29430270. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
713. Singleton CR, Wichelecki J, Weber SJ, et al. Individual and Household-Level Factors Associated With Caregivers' Intention to Keep Their Child Enrolled in WIC. J Nutr Educ Behav. 2021 Feb;53(2):157-63. doi: 10.1016/j.jneb.2020.10.002. PMID: 33214028. **-Does not provide any outcome of interest**
714. Singleton CR. An examination of farm-to-consumer retail outlet usage among participants of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in Birmingham, AL: ProQuest Information & Learning; 2016. **-Relevant Systematic Review or Dissertation that applies to the question**
715. Singleton CR. Self-perceived diet quality, obesity status, and household food purchasing behaviors among us adults. Circulation. 2016;133. - **Conference/meeting abstract**

716. Slider-Whichard J, Caslin J, Humbert L. Spotlight on the Safety Net: The Food Bank's Role in Disaster Relief and Historic Response to Hurricane Florence. *N C Med J*. 2020 Sep-Oct;81(5):342-3. doi: 10.18043/ncm.81.5.342. PMID: 32900900. **-No original data**
717. Smith AJ, Harney KF, Chien AT. Does maternal mental health affect initiation, exclusivity, and duration of breastfeeding? *Obstetrics and Gynecology*. 2015;125:49S. doi: 10.1097/01.AOG.0000463101.44298.db. **- Conference/meeting abstract**
718. Smith JD, Berkel C, Hails KA, et al. Predictors of Participation in the Family Check-Up Program: a Randomized Trial of Yearly Services from Age 2 to 10 Years. *Prevention Science*. 2018;19(5):652-62. doi: 10.1007/s11121-016-0679-7. **-No mention of WIC program**
719. Smith S. The evaluation of the revised special supplemental nutrition program for women, infants, and children (WIC) on consumption of fruits and vegetables In Tennessee: ProQuest Information & Learning; 2018. **- Relevant Systematic Review or Dissertation that applies to the question**
720. Smock L, Nguyen T, Metallinos-Katsaras E, et al. Refugee Children's Participation in the Women, Infants, and Children Supplemental Nutrition (WIC) Program in Massachusetts, 1998-2010. *J Public Health Manag Pract*. 2019 Jan/Feb;25(1):69-77. doi: 10.1097/phh.0000000000000789. PMID: 29672357. **-Does not provide any outcome of interest**
721. Solomon CA, Batada A, Zillante A, et al. Food cost is the least of my worries: a qualitative study exploring food and beverage purchasing decisions among parents enrolled in the WIC program. *Journal of Hunger and Environmental Nutrition*. 2018;13(4):497-506. doi: 10.1080/19320248.2018.1484313. **- Is Qualitative study but does not linked to an outcome of interest**
722. Sparks PJ. Childhood morbidities among income- and categorically-eligible WIC program participants and non-participants. *Journal of Children and Poverty*. 2010;16(1):47-66. doi: 10.1080/10796120903575093. **-No data since 2009**
723. Sparks PJ. Racial/ethnic differences in breastfeeding duration among WIC-eligible families. *Womens Health Issues*. 2011 Sep-Oct;21(5):374-82. doi: 10.1016/j.whi.2011.03.002. PMID: 21565528. **-No data since 2009**
724. Spence EH. Texas star achievers: Improving breastfeeding rates through a state-wide breastfeeding learning collaborative (TBLC). *Breastfeeding Medicine*. 2014;9:S-12. doi: 10.1089/bfm.2014.9976. **- Conference/meeting abstract**
725. Stallings TL, Gazmararian JA, Goodman M, et al. The Georgia WIC Farmers' Market Nutrition Program's Influence on Fruit and Vegetable Intake and Nutrition Knowledge and Competencies



- Among Urban African American Women and Children. *Journal of Hunger and Environmental Nutrition*. 2016;11(1):86-101. doi: 10.1080/19320248.2015.1045674. - **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
726. Steeves S, Acciai F, Tasevska N, et al. The Special Supplemental Nutrition Program for Women, Infants, and Children Spillover Effect: Do Siblings Reap the Benefits? *J Acad Nutr Diet*. 2020 Aug;120(8):1288-94. doi: 10.1016/j.jand.2020.02.013. PMID: 32402760. -**Does not provide any outcome of interest**
727. Steimle S, Gassman-Pines A, Johnson AD, et al. Understanding patterns of food insecurity and family well-being amid the COVID-19 pandemic using daily surveys. *Child development*. 2021doi: 10.1111/cdev.13659. -**No mention of WIC program**
728. Stockbauer JW. Evaluation of the Missouri WIC program: Prenatal components. *Journal of the American Dietetic Association*. 1986;86(1):61-7. -**Other: Pre-2000 data for mortality and child development outcomes**
729. Stockbauer JW. Evaluation of the Missouri WIC program: Prenatal components. *Journal of the American Dietetic Association*. 1986;86(1):61-7. - **Other: Pre-2000 data**
730. Stockbauer JW. WIC prenatal participation and its relation to pregnancy outcomes in Missouri: A second look. *American Journal of Public Health*. 1987;77(7):813-8. doi: 10.2105/AJPH.77.7.813. - **Other: Pre-2000 data for mortality and child development outcomes**
731. Stockbauer JW. WIC prenatal participation and its relation to pregnancy outcomes in Missouri: A second look. *American Journal of Public Health*. 1987;77(7):813-8. doi: 10.2105/AJPH.77.7.813. - **Other: Pre-2000 data**
732. Stockwell MS, Irigoyen M, Martinez RA, et al. How parents' negative experiences at immunization visits affect child immunization status in a community in New York City. *Public Health Rep*. 2011 Jul-Aug;126 Suppl 2(Suppl 2):24-32. doi: 10.1177/00333549111260s204. PMID: 21812166. -**Does not provide any outcome of interest**
733. Stolzer J, Zeece P. Low income women and physician breastfeeding advice: A regional assessment. *Health Education Journal*. 2006;65(2):126-34. doi: 10.1177/001789690606500203. - **Does not provide any OUTCOME of interest (Mortality, children development)**
734. Stolzer JM. Breastfeeding and WIC participants: A qualitative analysis. *Journal of Poverty*. 2010;14(4):423-42. doi: 10.1080/10875549.2010.517081. - **No data since 2009**
735. Straub H, Drennan KJ, Pflugeisen B. Maternal marijuana use: A natural experiment from prohibition to access. *American Journal of*

- Obstetrics and Gynecology.  
2017;216(1):S554-S5. -  
**Conference/meeting abstract**
736. Stremmler J, Lovera D. Insight from a breastfeeding peer support pilot program for husbands and fathers of Texas WIC participants. Journal of Human Lactation. 2004;20(4):417-22. doi: 10.1177/0890334404267182. -  
**Does not provide any OUTCOME of interest (Mortality, children development)**
737. Stuebe A. Is my baby hungry? Feeding cues in a north carolina WIC population. Breastfeeding Medicine. 2013;8:S-6. doi: 10.1089/bfm.2013.9982. -  
**Conference/meeting abstract**
738. Sun Y, Sundell J. Early daycare attendance increase the risk for respiratory infections and asthma of children. J Asthma. 2011 Oct;48(8):790-6. doi: 10.3109/02770903.2011.604884. PMID: 21838620. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
739. Sundborn G, Thornley SJ, Lang B, et al. Better health or better business: A critique of the childhood obesity plan. New Zealand Medical Journal. 2016;129(1440):145-8. **-No original data**
740. Sunil TS, Spears WD, Hook L, et al. Initiation of and barriers to prenatal care use among low-income women in San Antonio, Texas. Matern Child Health J. 2010 Jan;14(1):133-40. doi: 10.1007/s10995-008-0419-0. PMID: 18843529. **-Does not provide any outcome of interest**
741. Surkan PJ, Gottlieb BR, McCormick MC, et al. Impact of a health promotion intervention on maternal depressive symptoms at 15 months postpartum. Matern Child Health J. 2012 Jan;16(1):139-48. doi: 10.1007/s10995-010-0729-x. PMID: 21153759. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
742. Sussner KM, Lindsay AC, Peterson KE. The influence of maternal acculturation on child body mass index at age 24 months. J Am Diet Assoc. 2009 Feb;109(2):218-25. doi: 10.1016/j.jada.2008.10.056. PMID: 19167948. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
743. Szucs KA, Miracle DJ, Rosenman MB. Breastfeeding knowledge, attitudes, and practices among providers in a medical home. Breastfeed Med. 2009 Mar;4(1):31-42. doi: 10.1089/bfm.2008.0108. PMID: 19196036. **-No data since 2009**
744. Tabb KM, Choi S, Pineros-Leano M, et al. Perinatal depression screening in a Women, Infants, and Children (WIC) program: perception of feasibility and acceptability among a multidisciplinary staff. Gen Hosp Psychiatry. 2015 Jul-Aug;37(4):305-9. doi: 10.1016/j.genhosppsych.2015.03.00

8. PMID: 25858684. **-Is Qualitative study but does not linked to an outcome of interest**
745. Tandon D. Promoting perinatal depression screening for low-income women in diverse settings. Archives of Women's Mental Health. 2013;16:S79. doi: 10.1007/s00737-013-0355-x. **-Non-USA based study**
746. Taylor CA. Socioeconomic position and low birth weight: An evaluation of selected measures across race in Michigan: ProQuest Information & Learning; 2012. **-Relevant Systematic Review or Dissertation that applies to the question**
747. Taylor CAL, Sarathchandra D. Socioeconomic position and low birth weight: Evaluating multiple and alternative measures across race in michigan. Social Sciences. 2014;3(3):549-64. doi: 10.3390/socsci3030549. **-No data since 2009**
748. Tedder J, Quintana EM. Online Education for WIC Professionals: Teaching Child Development to Extend Breastfeeding Duration. Clinical Lactation. 2018;9(3):108-16. doi: 10.1891/2158-0782.9.3.108. PMID: 135082219. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
749. Tender JAF, Janakiram J, Arce E, et al. Reasons for in-hospital formula supplementation of breastfed infants from low-income families. Journal of Human Lactation. 2009;25(1):11-7. doi: 10.1177/0890334408325821. **-No data since 2009**
750. Tenfelde S, Zielinski R, Heidarisa RL. Why WIC Women Stop Breastfeeding?: Analysis of Maternal Characteristics and Time to Cessation. Infant, Child, and Adolescent Nutrition. 2013;5(4):207-14. doi: 10.1177/1941406413492820. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
751. Tenfelde SM. Predictors of breastfeeding exclusivity and duration in a sample of WIC participants: University of Illinois at Chicago, Health Sciences Center; 2009. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
752. Tenkku LE, Flick LH, Homan S, et al. Psychiatric disorders among low-income women and unintended pregnancies. Womens Health Issues. 2009 Sep-Oct;19(5):313-24. doi: 10.1016/j.whi.2009.07.006. PMID: 19733801. **-No data since 2009**
753. Terrell JL. Social ecological influences of WIC programming behavior change of former WIC participants: ProQuest Information & Learning; 2016. **-No mention of WIC program**
754. Testa A, Jackson DB. Race, ethnicity, WIC participation, and infant health disparities in the United States. Ann Epidemiol. 2021 Jun;58:22-8. doi: 10.1016/j.annepidem.2021.02.005. PMID: 33626410. **-Does not contain a comparison group or**

**address the association between  
WIC participation and an  
outcome of interest**

755. The Lancet Child Adolescent H. Pandemic school closures: risks and opportunities. Lancet Child Adolesc Health. 2020 May;4(5):341. doi: 10.1016/s2352-4642(20)30105-x. PMID: 32277875. **-No original data**
756. Thompson IJB, Ritchie LD, Bradshaw PT, et al. Earlier Introduction to Sugar-Sweetened Beverages Associated With Lower Diet Quality Among WIC Children at Age 3 Years. J Nutr Educ Behav. 2021 Jul 3doi: 10.1016/j.jneb.2021.04.468. PMID: 34229969. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
757. Thorndike AN, Bright OJM, Dimond MA, et al. Choice architecture increases wic fruit and vegetable purchases in a latino community: Randomized, controlled corner store intervention. Circulation. 2016;133. - **Conference/meeting abstract**
758. Thorndike AN, Bright OM, Dimond MA, et al. Choice architecture to promote fruit and vegetable purchases by families participating in the Special Supplemental Program for Women, Infants, and Children (WIC): randomized corner store pilot study. Public Health Nutr. 2017 May;20(7):1297-305. doi: 10.1017/s1368980016003074. PMID: 27890020. **-Does not provide any outcome of interest**
759. Thornton H, Crixell S, Shumake J, et al. Body mass index influences breastfeeding initiation and duration in a central Texas WIC population. FASEB Journal. 2014;28(1). - **Conference/meeting abstract**
760. Thornton P. Characteristics of Spontaneous Births Attended by Midwives and Physicians in US Hospitals in 2014. J Midwifery Womens Health. 2017 Sep;62(5):531-7. doi: 10.1111/jmwh.12638. PMID: 28806489. **-No mention of WIC program**
761. Thrower AC, Danawi H, Lockett C. Determinants of High Pre-pregnancy BMI of U.S. Puerto Rican WIC Participants. International Journal of Childbirth Education. 2013;28(4):55-61. PMID: 104144384. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
762. Thrower AC. Determinants of high prepregnancy BMI of Puerto Rican WIC participants in the United States: ProQuest Information & Learning; 2014. **-Relevant Systematic Review or Dissertation that applies to the question**
763. Tibbits M, Wang H, Soliman G, et al. Demographic differences in healthy food purchases in a corner store intervention. Journal of Hunger and Environmental Nutrition. 2018;13(4):531-9. doi: 10.1080/19320248.2017.1403405. - **Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

764. Tomayko E, Mosso K, Cronin K, et al. High household food insecurity impacts dietary patterns in rural and urban American Indian families with young children. *FASEB Journal*. 2016;30. - **Conference/meeting abstract**
765. Topolyan I, Xu X. Differential effects of mother's and child's postnatal WIC participation on breastfeeding. *Applied Economics*. 2017;49(23):2216-25. doi: 10.1080/00036846.2016.1234702. - **No data since 2009**
766. Townsend MS, Shilts MK, Lanoue L, et al. Obesity Risk Assessment Tool for Low-Income Spanish Speaking Immigrant Parents with Young Children: Validity with BMI and Biomarkers of Obesity. *Nutrients*. 2020 Nov 22;12(11)doi: 10.3390/nu12113582. PMID: 33266497. - **Does not provide any OUTCOME of interest (Mortality, children development)**
767. Toy S, Tripodis Y, Yang K, et al. Influence of Maternal Depression on WIC Participation in Low-Income Families. *Matern Child Health J*. 2016 Mar;20(3):710-9. doi: 10.1007/s10995-015-1871-2. PMID: 26645615. -**No data since 2009**
768. Treadway NJ, Diop H, Lu E, et al. Using surveillance data to inform a SUID reduction strategy in Massachusetts. *Inj Epidemiol*. 2014 Dec;1(1):12. doi: 10.1186/2197-1714-1-12. PMID: 27747680. -**Does not provide any outcome of interest**
769. Trout KK, Homko CJ, Wetzel-Effinger L, et al. Macronutrient Composition or Social Determinants? Impact on Infant Outcomes With Gestational Diabetes Mellitus. *Diabetes Spectr*. 2016 May;29(2):71-8. doi: 10.2337/diaspect.29.2.71. PMID: 27182173. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
770. Tuttle CR, Dewey KG. Potential cost savings for Medi-Cal, AFDC, food stamps, and WIC programs associated with increasing breastfeeding among low-income Hmong women in California. *Journal of the American Dietetic Association*. 1996;96(9):885-90. - **Other: Pre-2000 data**
771. Ukoli FAM, Cheaves M, McPherson KD, et al. Social Support and Baby-Friendly Hospital Care: Improving Breastfeeding Rates among African American Mothers. *Obstetrics and Gynecology*. 2019;133(SUPPL 1)doi: 10.1097/01.AOG.0000559321.50155.24. - **Conference/meeting abstract**
772. Vaaler ML, Stagg J, Parks SE, et al. Breast-feeding attitudes and behavior among WIC mothers in Texas. *J Nutr Educ Behav*. 2010 May-Jun;42(3 Suppl):S30-8. doi: 10.1016/j.jneb.2010.02.001. PMID: 20399407. -**No data since 2009**
773. Vadiveloo M, Perraud E, Parker HW, et al. Geographic differences in the dietary quality of food purchases among participants in the nationally representative food acquisition and purchase survey

- (FoodAPS). Nutrients. 2019;11(6)doi: 10.3390/nu11061233. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
774. Vaidyanathan A, Staley F, Shire J, et al. Screening for lead poisoning: a geospatial approach to determine testing of children in at-risk neighborhoods. J Pediatr. 2009 Mar;154(3):409-14. doi: 10.1016/j.jpeds.2008.09.027. PMID: 19026427. **-No data since 2009**
775. Valencia AC, Thomson CA, Duncan B, et al. Evaluating Latino WIC Mothers' Perceptions of Infant's Healthy Growth: A Formative Assessment. Matern Child Health J. 2016 Mar;20(3):525-33. doi: 10.1007/s10995-015-1850-7. PMID: 26530036. **-Does not provide any outcome of interest**
776. Valent A, Newman T, Chen A, et al. Gestational age-specific neonatal morbidity among pregnancies complicated by advanced maternal age. American Journal of Obstetrics and Gynecology. 2013;208(1):S292-S3. doi: 10.1016/j.ajog.2012.10.033. - **Conference/meeting abstract**
777. Vasan A, Kenyon CC, Feudtner C, et al. Association of WIC Participation and Electronic Benefits Transfer Implementation. JAMA Pediatrics. 2021;175(6):609-16. doi: 10.1001/jamapediatrics.2020.6973. PMID: 150855667. **-Does not provide any outcome of interest**
778. Vasan A, Kenyon CC, Roberto CA, et al. Association of Remote vs In-Person Benefit Delivery With WIC Participation During the COVID-19 Pandemic. Jama. 2021 Aug 20doi: 10.1001/jama.2021.14356. PMID: 34415293. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
779. Venkataramani MS, Maruthur N. Social service touchpoints as opportunities to screen women at high risk for type 2 diabetes. Journal of General Internal Medicine. 2019;34(2):S355. doi: 10.1007/11606.1525-1497. - **Conference/meeting abstract**
780. Ventura AK, Silva Garcia K, Meza M, et al. Promoting Responsive Bottle-Feeding Within WIC: Evaluation of a Policy, Systems, and Environmental Change Approach. J Acad Nutr Diet. 2021 Jun 2doi: 10.1016/j.jand.2021.05.003. PMID: 34090838. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
781. Ventura AK, Teitelbaum S. Maternal Distraction During Breast- and Bottle Feeding Among WIC and non-WIC Mothers. J Nutr Educ Behav. 2017 Jul-Aug;49(7 Suppl 2):S169-S76.e1. doi: 10.1016/j.jneb.2017.04.004. PMID: 28689554. **-Is Qualitative study but does not linked to an outcome of interest**
782. Ver Ploeg M. Do benefits of U.S. food assistance programs for

- children spillover to older children in the same household? Journal of Family and Economic Issues. 2009;30(4):412-27. doi: 10.1007/s10834-009-9164-9. **-No data since 2009**
783. Vladutiu CJ, Mobley SC, Ji X, et al. A Methodological Approach for Evaluating the Enterprise Community Healthy Start Program in Rural Georgia: An Analysis Using Linked PRAMS, Birth Records and Program Data. Matern Child Health J. 2021 Oct;25(10):1516-25. doi: 10.1007/s10995-021-03205-4. PMID: 34417685. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
784. Von Bank J, Van Der Heijden H, Rogers J, et al. Feeding practices of infants and toddlers in the special supplemental nutrition program for Women, Infants and Children (WIC) in San Marcos, Texas. FASEB Journal. 2010;24. - **Conference/meeting abstract**
785. Vu G, Warden C, Kalmar C, et al. Is poverty associated with orofacial clefts? An analysis of orofacial cleft risk and socioeconomic status utilizing the United States birth data. Cleft Palate-Craniofacial Journal. 2020;57(4):48. doi: 10.1177/1055665620901804. - **Conference/meeting abstract**
786. Waddill ME, Spence ME, Aaron K, et al. Use of multiple household food inventories to measure food availability: Health happens preschool program. FASEB Journal. 2017;31(1). - **Conference/meeting abstract**
787. Wang K. Acculturation, sociodemographic and environmental determinants of dietary intake among Asian immigrants in the United States: ProQuest Information & Learning; 2018. **-Relevant Systematic Review or Dissertation that applies to the question**
788. Wang MC, Freaney PM, Perak AM, et al. Trends in prepregnancy cardiovascular health in the United States, 2011-2019. Am J Prev Cardiol. 2021 Sep;7:100229. doi: 10.1016/j.ajpc.2021.100229. PMID: 34401862. **-Does not provide any outcome of interest**
789. Ware JL, Love D, Ladipo J, et al. African American Breastfeeding Peer Support: All Moms Empowered to Nurse. Breastfeed Med. 2021 Feb;16(2):156-64. doi: 10.1089/bfm.2020.0323. PMID: 33591227. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
790. Washio Y, Humphreys M, Colchado E, et al. Incentive-based Intervention to Maintain Breastfeeding Among Low-income Puerto Rican Mothers. Pediatrics. 2017 Mar;139(3)doi: 10.1542/peds.2016-3119. PMID: 28167511. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

791. Washio Y, Humphreys M, Zeigler D. Staff acceptability of contingency management to promote longer breastfeeding duration at WIC. *Drug and Alcohol Dependence*. 2015;156:e235. doi: 10.1016/j.drugalcdep.2015.07.632. - **Conference/meeting abstract**
792. Washio Y, Novack Wright E, Davis-Vogel A, et al. Prior Exposure to Intimate Partner Violence Associated With Less HIV Testing Among Young Women. *J Interpers Violence*. 2018 Apr 1;886260518768564. doi: 10.1177/0886260518768564. PMID: 29651922. -**Does not provide any outcome of interest**
793. Waters R. After prison, healthy lives built on access to care and community: A north carolina program helps recently released inmates connect to health care, social services, and support. *Health Affairs*. 2019;38(10):1616-21. doi: 10.1377/hlthaff.2019.01163. -**No original data**
794. Watkins S, Meltzer-Brody S, Zolnoun D, et al. Early breastfeeding experiences and postpartum depression. *Obstet Gynecol*. 2011 Aug;118(2 Pt 1):214-21. doi: 10.1097/AOG.0b013e3182260a2d. PMID: 21734617. -**No data since 2009**
795. Watowicz RP, Taylor CA. A comparison of beverage intakes in US children based on WIC participation and eligibility. *J Nutr Educ Behav*. 2014 May-Jun;46(3 Suppl):S59-64. doi: 10.1016/j.jneb.2014.02.002. PMID: 24809998. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
796. Watson D, Kim Y, Pope J, et al. The effects of receiving supplemental formula from WIC on a mother's decision to discontinue breastfeeding. *FASEB Journal*. 2014;28(1). - **Conference/meeting abstract**
797. Watts V, Rockett H, Baer H, et al. Assessing diet quality in a population of low-income pregnant women: a comparison between Native Americans and Whites. *Maternal & Child Health Journal*. 2007;11(2):127-36. doi: 10.1007/s10995-006-0155-2. PMID: 106297894. - **Does not provide any OUTCOME of interest (Mortality, children development)**
798. Weber S, Uesugi K, Greene H, et al. Preferences and Perceived Value of WIC Foods Among WIC Caregivers. *J Nutr Educ Behav*. 2018 Jul-Aug;50(7):695-704. doi: 10.1016/j.jneb.2018.04.280. PMID: 30047482. -**Does not provide any outcome of interest**
799. Weedn A, Blucker R, Gillaspie S. Qualitative examination of health perceptions and obesity among mothers of preschool-aged American Indian children. *Pediatrics*. 2018;141(1)doi: 10.1542/peds.141.1-MeetingAbstract.592. - **Conference/meeting abstract**
800. Weedn AE, Ang SC, Zeman CL, et al. Obesity prevalence in low-income preschool children in



- Oklahoma. Clin Pediatr (Phila). 2012 Oct;51(10):917-22. doi: 10.1177/0009922812441861. PMID: 22523274. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
801. Weedn AE, Hale JJ, Thompson DM, et al. Trends in obesity prevalence and disparities among low-income children in Oklahoma, 2005–2010. Childhood Obesity. 2014;10(4):318-25. PMID: 2015-31343-006. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
802. Weisband YL, Gallo MF, Klebanoff M, et al. Who Uses a Midwife for Prenatal Care and for Birth in the United States? A Secondary Analysis of Listening to Mothers III. Womens Health Issues. 2018 Jan-Feb;28(1):89-96. doi: 10.1016/j.whi.2017.07.004. PMID: 28864141. **-Does not apply to any of the Key Questions**
803. Welsh JA, Tenorio-Martinez S, Nelson J, et al. Perceptions regarding 100% fruit juice among parents who give them to their. Pediatrics. 2021;147(3):172-3. doi: 10.1542/peds.147.3\_MeetingAbstract.172-a. **- Conference/meeting abstract**
804. Wen KY, Miller SM, Roussi P, et al. A content analysis of self-reported barriers and facilitators to preventing postpartum smoking relapse among a sample of current and former smokers in an underserved population. Health Educ Res. 2015 Feb;30(1):140-51. doi: 10.1093/her/cyu048. PMID: 25099776. **-Is Qualitative study but does not linked to an outcome of interest**
805. Wende ME, Liu J, McLain AC, et al. Gestational weight gain disparities in South Carolina: Temporal trends, 2004-2015. Paediatric and Perinatal Epidemiology. 2020doi: 10.1111/ppe.12706. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
806. Wensel CR, Trude ACB, Poirier L, et al. B'more Healthy Corner Stores for Moms and Kids: Identifying Optimal Behavioral Economic Strategies to Increase WIC Redemptions in Small Urban Corner Stores. Int J Environ Res Public Health. 2018 Dec 27;16(1)doi: 10.3390/ijerph16010064. PMID: 30591654. **-Does not provide any outcome of interest**
807. West J, Crookston B, Richards R, et al. Identifying barriers preventing latina women from accessing wic online nutrition information. Annals of Nutrition and Metabolism. 2013;63:925. doi: 10.1159/000354245. **- Conference/meeting abstract**
808. Westfall M. Are infant feeding practices associated with early childhood overweight and obesity? A longitudinal study of participants of the special supplemental nutrition program for women, infants and children: ProQuest Information & Learning; 2021. **-Does not contain**

**a comparison group or address the association between WIC participation and an outcome of interest**

809. Whaley S, Koleilat M, Whaley M. Breastfeeding & obesity: WIC policy changes increase breastfeeding rates and reduce obesity at age four. FASEB Journal. 2012;26. - **Conference/meeting abstract**
810. Whaley SE, Jiang L, Gomez J, et al. Literacy promotion for families participating in the women, infants and children program. Pediatrics. 2011 Mar;127(3):454-61. doi: 10.1542/peds.2009-3572. PMID: 21321029. -**No data since 2009**
811. Whaley SE, Martinez CE, Paolicelli C, et al. Predictors of WIC Participation Through 2 Years of Age. J Nutr Educ Behav. 2020 Jul;52(7):672-9. doi: 10.1016/j.jneb.2019.12.015. PMID: 32067886. -**Does not provide any outcome of interest**
812. Whaley SE, McGregor S, Jiang L, et al. A WIC-based intervention to prevent early childhood overweight. J Nutr Educ Behav. 2010 May-Jun;42(3 Suppl):S47-51. doi: 10.1016/j.jneb.2010.02.010. PMID: 20399409. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
813. Whaley SE, Whaley M, Au LE, et al. Breastfeeding Is Associated With Higher Retention in WIC After Age 1. J Nutr Educ Behav. 2017 Nov-Dec;49(10):810-6.e1. doi: 10.1016/j.jneb.2017.07.003.

PMID: 28890264. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

814. Wheeler AL, Chapman-Novakofski K. Farmers' markets: costs compared with supermarkets, use among WIC clients, and relationship to fruit and vegetable intake and related psychosocial variables. J Nutr Educ Behav. 2014 May-Jun;46(3 Suppl):S65-70. doi: 10.1016/j.jneb.2013.11.016. PMID: 24809999. -**Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
815. Whisner CM, Bruening M, O'Brien KO. A Brief Survey of Dietary Beliefs and Behaviors of Pregnant Adolescents. J Pediatr Adolesc Gynecol. 2016 Oct;29(5):476-81. doi: 10.1016/j.jpag.2016.03.002. PMID: 26995508. -**No mention of WIC program**
816. Wicks TI. Breastfeeding in Mississippi: Factors that impact initiation and duration: ProQuest Information & Learning; 2018. - **Relevant Systematic Review or Dissertation that applies to the question**
817. Wightkin J, Magnus JH, Farley TA, et al. Psychosocial predictors of being an underweight infant differ by racial group: a prospective study of Louisiana WIC Program participants. Maternal & Child Health Journal. 2007;11(1):49-55. doi: 10.1007/s10995-006-0129-4. PMID: 106257853. - **Does not provide any OUTCOME of**

**interest (Mortality, children development)**

818. Williams CM, McDaniel H, Chavan NR. Adequate weight gain during pregnancy by pre-pregnancy body mass index: Who gets it right? Obstetrics and Gynecology. 2018;131:35S. - **Conference/meeting abstract**
819. Williams VN. A mixed-methods approach to characterizing cross-sector collaboration and its effects in nurse-family partnership: ProQuest Information & Learning; 2020. **-Does not apply to any of the Key Questions**
820. Wilson A, Hartell B, Fredericks L, et al. Evaluating a One-Year Innovative Fruit and Vegetable Sampling Program for WIC Children: Willow Comes to WIC. Journal of the Academy of Nutrition & Dietetics. 2012;112:A76-A. doi: 10.1016/j.jand.2012.06.268. PMID: 104429368. - **Conference/meeting abstract**
821. Wimer C, Nam J, Waldfogel J, et al. Trends in Child Poverty Using an Improved Measure of Poverty. Acad Pediatr. 2016 Apr;16(3 Suppl):S60-6. doi: 10.1016/j.acap.2016.01.007. PMID: 27044704. **-No mention of WIC program**
822. Winham DM, Palmer SM, Armstrong Florian TL, et al. Health Behaviors among Low-income Hispanic and Non-Hispanic White Women. American Journal of Health Behavior. 2018;42(3):56-68. doi: 10.5993/AJHB.42.3.6. PMID: 128913230. **-Does not provide any outcome of interest**
823. Winham DM, Tisue ME, Palmer SM, et al. Dry Bean Preferences and Attitudes among Midwest Hispanic and Non-Hispanic White Women. Nutrients. 2019 Jan 15;11(1)doi: 10.3390/nu11010178. PMID: 30650616. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
824. Witters-Green R. Increasing breastfeeding rates in working mothers. Families, Systems & Health: The Journal of Collaborative Family HealthCare. 2003 Winter2003;21(4):415-34. doi: 10.1037/h0089617. PMID: 106560961. - **No original data (opinion, descriptive data, letters, editorial, commentary)**
825. Wojcicki JM, Gugig R, Kathiravan S, et al. Maternal knowledge of infant feeding guidelines and label reading behaviours in a population of new mothers in San Francisco, California. Matern Child Nutr. 2009 Jul;5(3):223-33. doi: 10.1111/j.1740-8709.2009.00181.x. PMID: 19888918. **-Does not provide any outcome of interest**
826. Wojcicki JM, Gugig R, Tran C, et al. Early exclusive breastfeeding and maternal attitudes towards infant feeding in a population of new mothers in San Francisco, California. Breastfeed Med. 2010 Feb;5(1):9-15. doi: 10.1089/bfm.2009.0003. PMID: 19772374. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

827. Wolfson J, Insolera N, Cohen A, et al. The Influence of Nutrition Assistance Program Participation, Parental Nutritional Knowledge, and Family Foodways on Food Security and Child Well-Being. University of Kentucky Center for Poverty Research Discussion Paper Series, DP2019-02 University of Kentucky Center for Poverty Research. 1936-9379. 2019. <http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=eric&AN=ED602222&site=ehost-live&scope=site&authtype=ip,shib&custid=s3555202> **-Does not provide any outcome of interest**
828. Woo Baidal JA, Nelson CC, Perkins M, et al. Childhood obesity prevention in the women, infants, and children program: Outcomes of the MA-CORD study. *Obesity* (Silver Spring). 2017 Jul;25(7):1167-74. doi: 10.1002/oby.21865. PMID: 28653498. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
829. Wood CT, Skinner AC, Yin HS, et al. Association Between Bottle Size and Formula Intake in 2-Month-Old Infants. *Acad Pediatr*. 2016 Apr;16(3):254-9. doi: 10.1016/j.acap.2015.08.001. PMID: 26525989. **-No mention of WIC program**
830. Workman SC, Molla A, Murphy M, et al. Understanding the impact of food insecurity in children with cystic fibrosis. *Pediatric Pulmonology*. 2020;55(SUPPL 2):130. doi: 10.1002/ppul.24528. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
831. Wu Q, Saitone TL, Sexton RJ. Food access, food deserts, and the women, infants, and children program. *Journal of Agricultural and Resource Economics*. 2017;42(3):310-28. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
832. Yadrick K, Horton J, Stuff J, et al. Perceptions of community nutrition and health needs in the Lower Mississippi Delta: a key informant approach. *Journal of Nutrition Education*. 2001;33(5):266-77. doi: 10.1016/s1499-4046(06)60291-1. PMID: 106905304. Corporate Author: Lower Mississippi Delta Nutrition Intervention Research Initiative Consortium. **- Other: Not evaluating WIC -participants**
833. Yarbrough K, Schilling EA, Ferris AM. Food security and supplemental nutrition assistance participation associated with home availability and preschool child consumption of 100% fruit juice. *FASEB Journal*. 2013;27. **- Conference/meeting abstract**
834. Yeh MC, Glick-Bauer M, Wechsler S. Fruit and vegetable consumption in the United States: Patterns, barriers and federal nutrition assistance programs. *Fruits, Vegetables, and Herbs: Bioactive Foods in Health Promotion*. Elsevier Inc.; 2016:411-22. **-Does not contain a comparison group**

**or address the association between WIC participation and an outcome of interest**

835. Yen ST. The effects of SNAP and WIC programs on nutrient intakes of children. Food Policy. 2010;35(6):576-83. doi: 10.1016/j.foodpol.2010.05.010. **-No data since 2009**
836. Yin HS, Sanders LM, Rothman RL, et al. Parent health literacy and "obesogenic" feeding and physical activity-related infant care behaviors. J Pediatr. 2014 Mar;164(3):577-83.e1. doi: 10.1016/j.jpeds.2013.11.014. PMID: 24370343. **-No mention of WIC program**
837. Yunzal-Butler C, Joyce T, Racine AD. Maternal smoking and the timing of WIC enrollment. Matern Child Health J. 2010 May;14(3):318-31. doi: 10.1007/s10995-009-0452-7. PMID: 19234775. **-No data since 2009**
838. Zeitlin W, McInerney M, Aveni K, et al. Maternal Factors Predicting Loss to Follow-Up from Newborn Hearing Screenings in New Jersey. Health Soc Work. 2021 Jun 21;46(2):115-24. doi: 10.1093/hsw/hlab012. PMID: 34153978. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
839. Zeitlin W, McInerney M, Aveni K, et al. Maternal Factors Predicting Loss to Follow-Up from Newborn Hearing Screenings in New Jersey. Health and Social Work. 2021;46(2):115-24. doi: 10.1093/hsw/hlab012. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
840. Zhang J, Hansen AR. Special Supplemental Nutrition Program for Women, Infants, and Children Program, a Social Experiment on Effective Strategies to Prevent Severe Obesity Among Preschool Children. JAMA Pediatr. 2018 Jul 1;172(7):704. doi: 10.1001/jamapediatrics.2018.1019. PMID: 29813160. **-No original data**
841. Zhang Q, Lamichhane R, Wouk K, et al. Prenatal perception of breastfeeding recommendation predicts early breastfeeding outcomes of participants in the Supplemental Nutrition Program for Women, Infants, and Children (WIC). Am J Clin Nutr. 2021 Jul 24doi: 10.1093/ajcn/nqab268. PMID: 34302329. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
842. Zhang Q, Lamichhane R, Wright M, et al. Trends in Breastfeeding Disparities in US Infants by WIC Eligibility and Participation. J Nutr Educ Behav. 2019 Feb;51(2):182-9. doi: 10.1016/j.jneb.2018.10.005. PMID: 30514654. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
843. Zhang Q, Tang C, McLaughlin PW, et al. Individual and Store

- Characteristics Associated with Brand Choices in Select Food Category Redemptions among WIC Participants in Virginia. *Int J Environ Res Public Health*. 2017 Mar 31;14(4)doi: 10.3390/ijerph14040364. PMID: 28362350.
844. Zhang Q, Zhang J, Park K, et al. App Usage Associated With Full Redemption of WIC Food Benefits: A Propensity Score Approach. *J Nutr Educ Behav*. 2021 Sep;53(9):779-86. doi: 10.1016/j.jneb.2021.03.002. PMID: 34175218. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
845. Zhang Q, Zhang J, Park K, et al. Association Between Usage of an App to Redeem Prescribed Food Benefits and Redemption Behaviors Among the Special Supplemental Nutrition Program for Women, Infants, and Children Participants: Cross-Sectional Study. *JMIR Mhealth Uhealth*. 2020 Oct 14;8(10):e20720. doi: 10.2196/20720. PMID: 33052133. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
846. Zhao N, Chung M, Lischko A, et al. Knowledge Translation and WIC Food Package Regulation Change. *J Am Coll Nutr*. 2020 Sep 11:1-10. doi: 10.1080/07315724.2020.1810170. PMID: 32915695. **- Does not provide any OUTCOME of interest (Mortality, children development)**
847. Zhou YE, Emerson JS, Husaini BA, et al. Association of infant feeding with adiposity in early childhood in a WIC sample. *J Health Care Poor Underserved*. 2014 Nov;25(4):1542-51. doi: 10.1353/hpu.2014.0181. PMID: 25418226. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
848. Zigmont VA, Tomczak SM, Bromage B, et al. Helps My Family Survive Hard Times: An Innovative Summertime Food Relief Program in New Haven, Connecticut. *Journal of Poverty*. 2021doi: 10.1080/10875549.2021.1890671. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
849. Zimmer MC, Beaird J, Steeves ETA. WIC Participants' Perspectives About Online Ordering and Technology in the WIC Program. *Journal of nutrition education and behavior*. 2020doi: 10.1016/j.jneb.2020.10.001. **- Does not provide any OUTCOME of interest (Mortality, children development)**
850. Zimmer MC, Rubio V, Kintziger KW, et al. Differences in Consumption of NASEM Priority Nutrients and Food Groups by Race/Ethnicity Among Women Living in WIC-Participating Households. *Am J Health Promot*. 2020 May 4:890117120920849. doi: 10.1177/0890117120920849.

PMID: 32363883. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

851. Zimmer MC, Rubio V, Kintziger KW, et al. Racial/Ethnic Disparities in Dietary Intake of U.S. Children Participating in WIC. *Nutrients*. 2019 Oct 31;11(11)doi: 10.3390/nu11112607. PMID: 31683601. **-Does not contain a comparison group or address the association between WIC participation and an outcome of interest**
852. Zimmer MC, Vernarelli JA. WIC works! positive influence of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) on diet quality in low income children. *FASEB Journal*. 2017;31(1). - **Conference/meeting abstract**
853. Ziol-Guest KM, Hernandez DC. First- and second-trimester WIC

participation is associated with lower rates of breastfeeding and early introduction of cow's milk during infancy. *J Am Diet Assoc*. 2010 May;110(5):702-9. doi: 10.1016/j.jada.2010.02.013. PMID: 20430131. **-No data since 2009**

854. Zuckerman KE, Chavez AE, Reeder JA. Decreasing Disparities in Child Development Assessment: Identifying and Discussing Possible Delays in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). *J Dev Behav Pediatr*. 2017 Jun;38(5):301-9. doi: 10.1097/dbp.0000000000000446. PMID: 28520635. **- Does not contain a comparison group or address the association between WIC participation and an outcome of interest**

## **Appendix C. Results**

### **Published Literature Search Results**

We retrieved 4,688 unique citations. After screening abstracts and the full text of articles, we included 95 articles. Appendix B provides a list of the excluded articles at full-text screening.

### **Grey Literature Search Results**

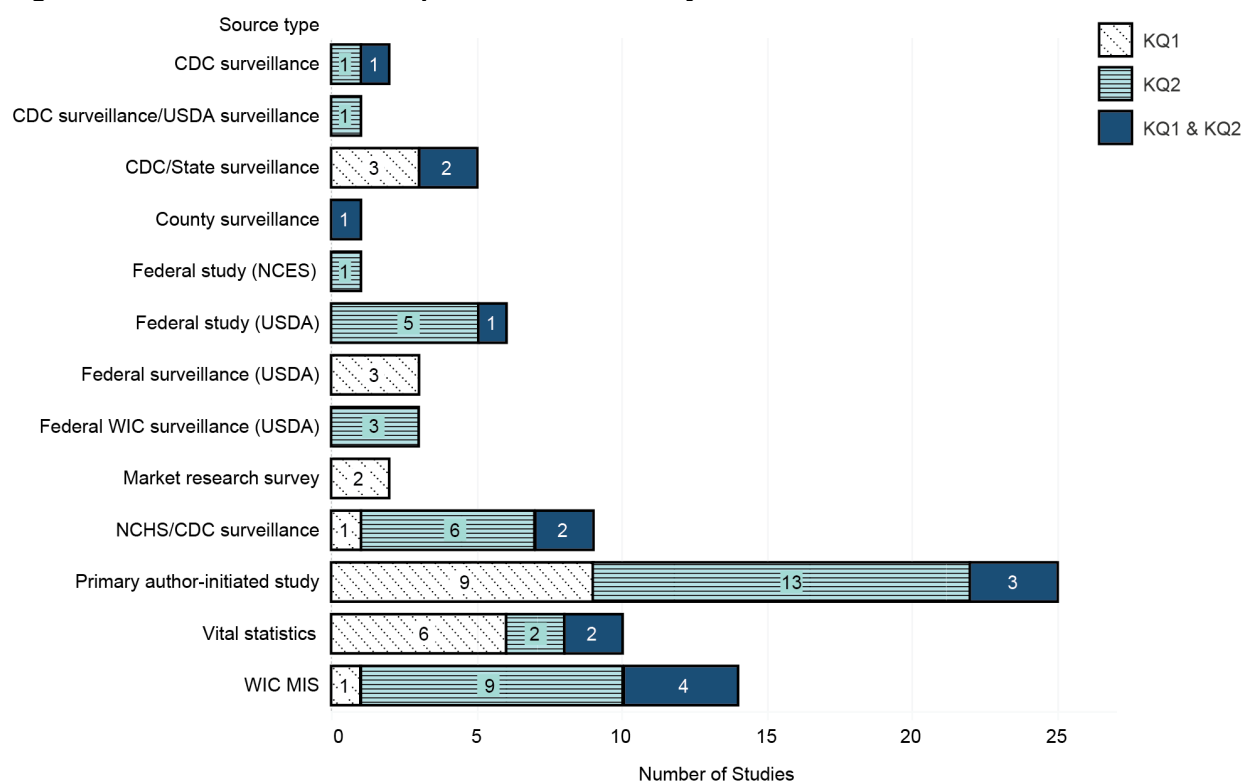
We searched six websites (Appendix A) for additional reports relevant for the review. These were reviewed by hand and compared with citations identified in our search of the published literature. We found three reports not covered by the published studies that evaluated the association of WIC participation and dietary and health outcomes. The findings were summarized with respect to specific outcomes in the main report.

### **Data Sources of Included Studies**

Figure C-1 displays the data sources of the included quantitative studies and the distribution among the Key Questions. Table C-1 shows the funding sources of all included articles including from the grey literature search. Table C-2 lists the data source type used in the quantitative studies, while Table C-3 shows the data sources and the outcomes reported from these sources. Details of included studies are found in Appendix D: Evidence Tables. These include study characteristics, inclusion and exclusion criteria, participant characteristics, intervention details, and all relevant outcomes.



**Figure C-1. Number of included quantitative studies by data source**



CDC=Centers for Disease Control and Prevention; KQ=Key Question; MIS=Management Information Systems; NCES=National Center for Education Statistics; NCHS=National Center for Health Statistics; USDA=United States Department of Agriculture; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Table C-1. Funding sources**

| Key Question | Author Year                  | Funding   | Funding Category               |
|--------------|------------------------------|---|--------------------------------|
| Qualitative  | Almeida, 2020 <sup>1</sup>   | California WIC  | State government               |
| Qualitative  | Anderson, 2015 <sup>2</sup>  | NIH/National Center for Advancing Translational Sciences                          | Federal government             |
| KQ2          | Anderson, 2020 <sup>3</sup>  | American Heart Association  | Non-profit                     |
| KQ2          | Anderson, 2020 <sup>4</sup>  | American Heart Association  | Non-profit                     |
| KQ1          | Andreyeva, 2013 <sup>5</sup> | USDA  | Federal government             |
| KQ1          | Andreyeva, 2013 <sup>6</sup> | USDA  | Federal government             |
| KQ1          | Andreyeva, 2014 <sup>7</sup> | USDA  | Federal government             |
| KQ1          | Andreyeva, 2015 <sup>8</sup> | USDA  | Federal government             |
| KQ1          | Andreyeva, 2016 <sup>9</sup> | Institute for Research on Poverty, RIDGE, USDA                                    | Federal government, Non-profit |
| KQ1          | Angley, 2018 <sup>10</sup>   | NIH/Eunice Kennedy Shriver National Institute of Child Health & Human Development | Federal government             |
| KQ2          | Arons, 2016 <sup>11</sup>    | NIH/NIMH, Urban Child Institute, UCSF   | Academic, Federal government   |
| KQ1          | Baer, 2019 <sup>12</sup>     | California Preterm Birth Initiative, UCSF   | Academic                       |
| KQ2          | Barrera, 2018 <sup>13</sup>  | No external funding   | No external funding            |

| Key Question    | Author Year                       | Funding  | Funding Category    |
|-----------------|-----------------------------------|--|---------------------|
| Qualitative     | Beck, 2014 <sup>14</sup>          | University of California Institute for Mexico and the United States  | Academic            |
| Qualitative     | Bedwell, 2017 <sup>15</sup>       | Indiana University Hutton Honors College   | Academic            |
| KQ2             | Bersak, 2018 <sup>16</sup>        | SUNY Oswego  | Academic            |
| KQ1             | Bersak, 2021 <sup>17</sup>        | SUNY Oswego  | Academic            |
| Qualitative     | Bertmann, 2014 <sup>18</sup>      | Arizona Department of Health Services  | State government    |
| KQ2             | Black, 2012 <sup>19</sup>         | The Annie E. Casey Foundation, The Anthony Spinazzola Foundation, Jean Schiro-Zavela and Vance Zavela donor-advised fund of the Hartford Foundation for Public Giving, The Claneil Foundation, The Eos Foundation, Feeding America, The Gryphon Fund, The Krupp Family Foundation, The Larson Family Foundation, The Paul and Phyllis Fireman Charitable Foundation, The Pew Charitable Trusts, The W. K. Kellogg Foundation, Susan Schiro and Peter Manus, and anonymous donors | Non-profit          |
| KQ2             | Bolbocean, 2020 <sup>20</sup>     | NR   | Not reported        |
| Grey literature | Borger, 2020 <sup>21</sup>        | USDA   | Federal government  |
| KQ2             | Casillas, 2017 <sup>22</sup>      | NR   | Not reported        |
| KQ2             | Chaparro, 2019 <sup>23</sup>      | American Heart Association   | Non-profit          |
| KQ2             | Chaparro, 2019 <sup>24</sup>      | American Heart Association   | Non-profit          |
| KQ2             | Chaparro, 2020 <sup>25</sup>      | American Heart Association   | Non-profit          |
| KQ2             | Chaparro, 2020 <sup>26</sup>      | American Heart Association   | Non-profit          |
| KQ2             | Chapparo, 2020 <sup>27</sup>      | American Heart Association   | Non-profit          |
| KQ2             | Chiasson, 2016 <sup>28</sup>      | NR   | Not reported        |
| KQ2             | Daepp, 2019 <sup>29</sup>         | NIH  | Federal government  |
| KQ1             | El-Bastawissi, 2007 <sup>30</sup> | Washington WIC   | State government    |
| KQ1             | Fang, 2019 <sup>31</sup>          | USDA   | Federal government  |
| KQ1             | Fingar, 2017 <sup>32</sup>        | California Title V Maternal and Child Health Services Block Grant, California WIC  | State government    |
| KQ2             | Freedman, 2017 <sup>33</sup>      | No external funding  | No external funding |
| Grey literature | Gleason, 2011 <sup>34</sup>       | USDA   | Federal government  |
| KQ1, KQ2        | Gleason, 2020 <sup>35</sup>       | NR   | Not reported        |
| Qualitative     | Gross, 2015 <sup>36</sup>         | NIH/Eunice Kennedy Shriver National Institute of Child Health & Human Development  | Federal government  |
| Qualitative     | Gross, 2017 <sup>37</sup>         | University of Georgia  | Academic            |
| KQ2             | Gu, 2017 <sup>38</sup>            | No external funding  | No external funding |
| KQ2             | Guan, 2021 <sup>39</sup>          | NIH  | Federal government  |
| KQ2             | Guthrie, 2018 <sup>40</sup>       | Nestle Research  | Private             |
| KQ2             | Guthrie, 2020 <sup>41</sup>       | Nestle Research  | Private             |

| Key Question | Author Year                       | Funding  | Funding Category             |
|--------------|-----------------------------------|--|------------------------------|
| KQ1          | Hamad, 2019 <sup>42</sup>         | NIH, University of California San Francisco National Center of Excellence in Women's Health                          | Federal government           |
| KQ1          | Hamad, 2019 <sup>43</sup>         | NIH, University of California San Francisco National Center of Excellence in Women's Health                          | Academic, Federal government |
| KQ2          | Hamner, 2019 <sup>44</sup>        | No external funding  | No external funding          |
| Qualitative  | Hohl, 2016 <sup>45</sup>          | INIH/National Cancer Institute   | Federal government           |
| Qualitative  | Hromi-Fiedler, 2016 <sup>46</sup> | NIH  | Federal government           |
| Qualitative  | Isaacs, 2020 <sup>47</sup>        | NR   | Not reported                 |
| KQ2          | Ishdorj, 2013 <sup>48</sup>       | NR   | Not reported                 |
| KQ2          | Jackson, 2015 <sup>49</sup>       | National Academy of Education/Spencer Foundation   | Non-profit                   |
| KQ1, KQ2     | Joyce, 2015 <sup>50</sup>         | USDA   | Federal government           |
| KQ2          | Jun, 2018 <sup>51</sup>           | Nestle Research  | Private                      |
| KQ1          | Kasim, 2021 <sup>52</sup>         | NR   | Not reported                 |
| KQ2          | Kay, 2021 <sup>53</sup>           | Nestle Research  | Private                      |
| Qualitative  | Kim, 2016 <sup>54</sup>           | USDA   | Federal government           |
| KQ1, KQ2     | Kong, 2014 <sup>55</sup>          | NIH/National Cancer Institute  | Federal government           |
| KQ2          | Lakshmanan, 2020 <sup>56</sup>    | Packard Foundation for Children's Health, the Saban Research Career Development Award, and the Confidence Foundation | Non-profit                   |
| KQ1, KQ2     | Langellier, 2014 <sup>57</sup>    | First 5 LA   | Non-profit                   |
| KQ1, KQ2     | Lee, 2017 <sup>58</sup>           | CDC  | Federal government           |
| KQ1, KQ2     | Li, 2019 <sup>59</sup>            | NIH/Eunice Kennedy Shriver National Institute of Child Health & Human Development, USDA                              | Federal government           |
| KQ1          | Litvak, 2020 <sup>60</sup>        | Did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors        | No external funding          |
| KQ2          | Ma, 2014 <sup>61</sup>            | NR   | Not reported                 |
| KQ1, KQ2     | McCoy, 2018 <sup>62</sup>         | NR   | Not reported                 |
| KQ2          | Meiqari, 2015 <sup>63</sup>       | CDC  | Federal government           |
| KQ2          | Morshed, 2015 <sup>64</sup>       | NIH/National Institute of Diabetes and Digestive and Kidney Diseases   | Federal government           |
| KQ1          | Ng, 2018 <sup>65</sup>            | Robert Wood Johnson Foundation   | Non-profit                   |
| KQ1          | Oberle, 202 <sup>66</sup>         | NIH  | Federal government           |
| KQ1, KQ2     | Odoms-Young, 2014 <sup>67</sup>   | NIH/National Cancer Institute, University of Illinois at Chicago   | Academic, Federal government |
| KQ1          | Oh, 2016 <sup>68</sup>            | USDA   | Federal government           |
| KQ2          | Oropesa, 2001 <sup>69</sup>       | NIH/National Institute of Child Health and Human Development, the Maternal and Child Health Bureau, CDC              | Federal government           |
| KQ2          | Pan, 2016 <sup>70</sup>           | NR   | Not reported                 |
| KQ2          | Pan, 2019 <sup>71</sup>           | NR   | Not reported                 |
| KQ2          | Pan, 2021 <sup>72</sup>           | No external funding  | No external funding          |

| Key Question    | Author Year                           | Funding   | Funding Category             |
|-----------------|---------------------------------------|---|------------------------------|
| KQ1             | Perkins, 2020 <sup>73</sup>           | USDA, NIH/National Institute of Food and Agriculture, Hatch project   | Academic, Federal government |
| KQ1             | Rhee, 2019 <sup>74</sup>              | NIH/NIMHD   | Federal government           |
| Qualitative     | Robson, 2020 <sup>75</sup>            | Delaware Department of Health and Human Services  | State government             |
| Qualitative     | Ruiz, 2011 <sup>76</sup>              | Not funded by any private or public organizations   | No external funding          |
| Qualitative     | Schindler-Ruwisch, 2019 <sup>77</sup> | No external funding   | No external funding          |
| Qualitative     | Scott, 2016 <sup>78</sup>             | University of Arkansas' Provost's Instructional Enhancement Grant   | Academic                     |
| KQ2             | Smock, 2020 <sup>79</sup>             | CDC   | Federal government           |
| KQ1             | Sonchak, 2016 <sup>80</sup>           | NR  | Not reported                 |
| KQ1, KQ2        | Sonchak, 2017 <sup>81</sup>           | SUNY Oswego   | Academic                     |
| KQ2             | Soneji, 2019 <sup>82</sup>            | National Institute of Child Health and Human Development  | Federal government           |
| KQ1             | Stewart, 2019 <sup>83</sup>           | No external funding   | No external funding          |
| KQ1             | Testa, 2020 <sup>84</sup>             | NR  | Not reported                 |
| KQ2             | Tester, 2016 <sup>85</sup>            | NIH/Eunice Kennedy Shriver National Institute of Child Health & Human Development, USDA                       | Federal government           |
| KQ2             | Thomas, 2014 <sup>86</sup>            | No external funding   | No external funding          |
| KQ2             | Thornton, 2014 <sup>87</sup>          | Texas State University  | Academic                     |
| KQ2             | Vercammen, 2018 <sup>88</sup>         | No financial disclosures  | No external funding          |
| Qualitative     | Weber, 2019 <sup>89</sup>             | Illinois Department of Human Services   | State government             |
| Grey literature | Weinfield, 2019 <sup>90</sup>         | USDA  | Federal government           |
| KQ2             | Weinfield, 2020 <sup>91</sup>         | USDA  | Federal government           |
| KQ2             | Weinfield, 2020 <sup>92</sup>         | USDA  | Federal government           |
| KQ1, KQ2        | Whaley, 2012 <sup>93</sup>            | First 5 LA  | Non-profit                   |
| KQ1, KQ2        | Whaley, 2012 <sup>94</sup>            | USDA  | Federal government           |
| KQ1, KQ2        | Wilde, 2012 <sup>95</sup>             | USDA  | Federal government           |
| KQ1             | Zhang, 2021 <sup>96</sup>             | NIH/Eunice Kennedy Shriver National Institute of Child Health & Human Development, USDA                       | Federal government           |
| KQ1, KQ2        | Zimmer, 2019 <sup>97</sup>            | Did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors | No external funding          |
| KQ2             | Zimmer, 2020 <sup>98</sup>            | No external funding   | No external funding          |

CDC=Centers for Disease Control; CREES=Cooperative State Research, Education, and Extension Service; LA=Los Angeles; NIH=National Institutes of Health; NR=not reported; RIDGE=Research Innovation and Development Grants in Economics; SUNY= The State University of New York; UCSF=University of California, San Francisco; USDA=United States Department of Agriculture; WIC= Special Supplemental Nutrition Program for Women, Infants and Children

**Table C-2. List of data sources from quantitative studies**

| Key Question | Author, Year                 | Source Type                    | Data Source |
|--------------|------------------------------|--------------------------------|-------------|
| KQ1          | Andreyeva, 2013 <sup>5</sup> | Primary author-initiated study | Supermarket |
| KQ1          | Andreyeva, 2013 <sup>6</sup> | Primary author-initiated study | Supermarket |

| <b>Key Question</b> | <b>Author, Year</b>               | <b>Source Type</b>             | <b>Data Source</b>   |
|---------------------|-----------------------------------|--------------------------------|--|
| KQ1                 | Andreyeva, 2014 <sup>7</sup>      | Primary author-initiated study | Supermarket  |
| KQ1                 | Andreyeva, 2015 <sup>8</sup>      | Primary author-initiated study | Supermarket  |
| KQ1                 | Andreyeva, 2016 <sup>9</sup>      | Primary author-initiated study | Supermarket  |
| KQ1                 | Angley, 2018 <sup>10</sup>        | Primary author-initiated study | Primary  |
| KQ1                 | Baer, 2019 <sup>12</sup>          | Vital Statistics               | Birth/death records  |
| KQ1                 | Bersak, 2021 <sup>17</sup>        | Vital Statistics               | Birth/death records  |
| KQ1                 | El-Bastawissi, 2007 <sup>30</sup> | Vital Statistics               | Birth/death records  |
| KQ1                 | Fang, 2019 <sup>31</sup>          | Federal surveillance (USDA)    | FoodAPS  |
| KQ1                 | Fingar, 2017 <sup>32</sup>        | Vital Statistics               | State surveys  |
| KQ1                 | Hamad, 2019 <sup>42</sup>         | Vital Statistics               | Birth certificates   |
| KQ1                 | Hamad, 2019 <sup>43</sup>         | Primary author-initiated study | Primary  |
| KQ1                 | Kasim, 2021 <sup>52</sup>         | CDC/State surveillance         | PRAMS  |
| KQ1                 | Litvak, 2020 <sup>60</sup>        | Federal surveillance (USDA)    | FoodAPS  |
| KQ1                 | Ng, 2018 <sup>65</sup>            | Market research survey         | The National Consumer Panel: Homescan data                               |
| KQ1                 | Oberle, 2020 <sup>66</sup>        | NCHS/CDC surveillance          | NHANES   |
| KQ1                 | Oh, 2016 <sup>68</sup>            | Market research survey         | The National Consumer Panel: Homescan data                               |
| KQ1                 | Perkins, 2020 <sup>73</sup>       | Primary author-initiated study | Web-Based Nutrition Education Evaluation and Reporting System (WebNEERS) |
| KQ1                 | Rhee, 2019 <sup>74</sup>          | Primary author-initiated study | Boston-based Children'sHealthWatch cohort                                |
| KQ1                 | Sonchak, 2016 <sup>80</sup>       | Vital Statistics               | Vital Statistics Natality Data from South Carolina                       |
| KQ1                 | Stewart, 2019 <sup>83</sup>       | Federal surveillance (USDA)    | FoodAPS  |
| KQ1                 | Testa, 2020 <sup>84</sup>         | CDC/State surveillance         | PRAMS  |
| KQ1                 | Zhang, 2021 <sup>96</sup>         | CDC/State surveillance         | National Immunization Surveys (NIS)                                      |
| KQ2                 | Anderson, 2020 <sup>3</sup>       | WIC MIS                        | Data Mining Project  |
| KQ2                 | Anderson, 2020 <sup>4</sup>       | WIC MIS                        | WIC MIS -Data Mining Project   |
| KQ2                 | Arons, 2016 <sup>11</sup>         | Primary author-initiated study | Primary  |
| KQ2                 | Barrera, 2018 <sup>13</sup>       | NCHS/CDC surveillance          | NHANES   |
| KQ2                 | Bersak, 2018 <sup>16</sup>        | Vital Statistics               | Birth/death records  |
| KQ2                 | Black, 2012 <sup>19</sup>         | Primary author-initiated study | Primary  |
| KQ2                 | Casillas, 2017 <sup>22</sup>      | CDC surveillance               | National Immunization Survey Child                                       |
| KQ2                 | Chaparro, 2019 <sup>23</sup>      | WIC MIS                        | Data Mining Project  |
| KQ2                 | Chaparro, 2019 <sup>24</sup>      | WIC MIS                        | Data Mining Project  |
| KQ2                 | Chaparro, 2020 <sup>25</sup>      | WIC MIS                        | Data Mining Project  |
| KQ2                 | Chaparro, 2020 <sup>26</sup>      | WIC MIS                        | Data Mining Project  |
| KQ2                 | Chaparro, 2020 <sup>27</sup>      | Primary author-initiated study | Data Mining Project  |
| KQ2                 | Chiasson, 2016 <sup>28</sup>      | WIC MIS                        | State surveys  |

| <b>Key Question</b> | <b>Author, Year</b>            | <b>Source Type</b>                 | <b>Data Source</b>   |
|---------------------|--------------------------------|------------------------------------|--|
| KQ2                 | Daepf, 2019 <sup>29</sup>      | Federal WIC surveillance (USDA)    | WIC Participant and Program Characteristics  |
| KQ2                 | Freedman, 2017 <sup>33</sup>   | WIC MIS                            | WIC MIS  |
| KQ2                 | Gu, 2017 <sup>38</sup>         | NCHS/CDC surveillance              | NHANES   |
| KQ2                 | Guan, 2021 <sup>39</sup>       | Primary author-initiated study     | CANDLE   |
| KQ2                 | Guthrie, 2018 <sup>40</sup>    | Primary author-initiated study     | FITS   |
| KQ2                 | Guthrie, 2020 <sup>41</sup>    | Primary author-initiated study     | FITS   |
| KQ2                 | Hamner, 2019 <sup>44</sup>     | NCHS/CDC surveillance              | NHANES   |
| KQ2                 | Ishdorj, 2013 <sup>48</sup>    | Federal study (USDA)               | National Food and Nutrition Survey for WIC (NATFAN)  |
| KQ2                 | Jackson, 2015 <sup>49</sup>    | Federal Study (NCES)               | ECLS-B   |
| KQ2                 | Jun, 2018 <sup>51</sup>        | Primary author-initiated study     | FITS   |
| KQ2                 | Kay, 2021 <sup>53</sup>        | Primary author-initiated study     | FITS   |
| KQ2                 | Lakshmanan, 2020 <sup>56</sup> | Primary author-initiated study     | Primary  |
| KQ2                 | Meiqari, 2015 <sup>63</sup>    | Primary author-initiated study     | Primary  |
| KQ2                 | Morshed, 2015 <sup>64</sup>    | Primary author-initiated study     | Primary  |
| KQ2                 | Oropesa, 2001 <sup>69</sup>    | Vital Statistics                   | Birth/death records  |
| KQ2                 | Pan, 2016 <sup>70</sup>        | Federal WIC surveillance (USDA)    | Federal WIC surveillance (USDA)  |
| KQ2                 | Pan, 2019 <sup>71</sup>        | Federal WIC surveillance (USDA)    | Federal WIC surveillance (USDA)  |
| KQ2                 | Pan, 2021 <sup>72</sup>        | WIC MIS                            | WIC MIS  |
| KQ2                 | Smock, 2020 <sup>79</sup>      | Primary author-initiated study     | Primary  |
| KQ2                 | Tester, 2016 <sup>85</sup>     | NCHS/CDC surveillance              | NHANES   |
| KQ2                 | Thomas, 2014 <sup>86</sup>     | CDC surveillance/USDA surveillance | WIC-LARS, NIS  |
| KQ2                 | Thornton, 2014 <sup>87</sup>   | Primary author-initiated study     | Primary  |
| KQ2                 | Vercammen, 2018 <sup>88</sup>  | NCHS/CDC surveillance              | NHANES   |
| KQ2                 | Weinfield, 2020 <sup>92</sup>  | Federal study (USDA)               | WIC Infant and Toddler Feeding Practices Study 2 (WIC ITFPS-2)   |
| KQ2                 | Weinfield, 2020 <sup>91</sup>  | Federal study (USDA)               | Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Infant and Toddler Feeding Practices Study-2 (ITFPS-2) |
| KQ2                 | Zimmer, 2020 <sup>98</sup>     | NCHS/CDC surveillance              | NHANES   |
| KQ1, KQ2            | Bolbocean, 2021 <sup>20</sup>  | Primary author-initiated study     | CANDLE   |
| KQ1, KQ2            | Gleason, 2020 <sup>35</sup>    | Federal study (USDA)               | Primary  |
| KQ1, KQ2            | Joyce, 2015 <sup>50</sup>      | CDC/State surveillance             | PRAMS  |
| KQ1, KQ2            | Kong, 2014 <sup>55</sup>       | Primary author-initiated study     | Primary  |
| KQ1, KQ2            | Langellier, 2014 <sup>57</sup> | County surveillance                | State surveys  |
| KQ1, KQ2            | Lee, 2017 <sup>58</sup>        | CDC surveillance                   | WIC MIS, PedNSS  |
| KQ1, KQ2            | Li, 2019 <sup>59</sup>         | NCHS/CDC surveillance              | NHANES   |
| KQ1, KQ2            | Ma, 2014 <sup>61</sup>         | CDC/State surveillance             | PRAMS  |

| Key Question    | Author, Year                    | Source Type                    | Data Source  |
|-----------------|---------------------------------|--------------------------------|--|
| KQ1, KQ2        | McCoy, 2018 <sup>62</sup>       | WIC MIS                        | Minnesota WIC information system                                     |
| KQ1, KQ2        | Odoms-Young, 2014 <sup>67</sup> | Primary author-initiated study | Primary  |
| KQ1, KQ2        | Sonchak, 2017 <sup>81</sup>     | Vital Statistics               | South Carolina Department of Health and Environmental Control (DHEC) |
| KQ1, KQ2        | Soneji, 2019 <sup>82</sup>      | Vital Statistics               | Birth/death records  |
| KQ1, KQ2        | Whaley, 2012 <sup>93</sup>      | WIC MIS                        | WIC MIS  |
| KQ1, KQ2        | Whaley, 2012 <sup>94</sup>      | WIC MIS                        | State surveys  |
| KQ1, KQ2        | Wilde, 2012 <sup>95</sup>       | WIC MIS                        | WIC MIS  |
| KQ1, KQ2        | Zimmer, 2019 <sup>97</sup>      | NCHS/CDC surveillance          | NHANES   |
| Grey Literature | Gleason, 2011 <sup>34</sup>     | WIC MIS                        | WIC MIS  |
| Grey Literature | Borger, 2020 <sup>21</sup>      | Primary                        | Federal study (USDA)   |
| Grey Literature | Weinfield, 2019 <sup>90</sup>   | Primary                        | Federal study (USDA)   |

CANDLE= Conditions Affecting Neurocognitive Development and Learning in Early Childhood; CDC=Centers for Disease Control and Prevention; DHEC=South Carolina Department of Health and Environmental Control; ECLS-B=Early Childhood Longitudinal Study, Birth Cohort; FITS=Feeding Infants and Toddlers Study; FoodAPS=National Household Food Acquisition and Purchase Survey; ITFPS-2=WIC Infant and Toddler Feeding Practices Study; KQ=Key Question; MIS=Management Information Systems; NATFAN=National Food and Nutrition Survey; NCES=National Center for Education Statistics; NCHS=National Center for Health Statistics; NHANES=National Health and Nutrition Examination Survey; NIS=National Immunization Survey; PedNSS=New York Pediatric Nutrition Surveillance System; PRAMS=Pregnancy Risk Assessment Monitoring System; USDA=United States Department of Agriculture; WebNEERS=Web-Based Nutrition Education Evaluation and Reporting System; WIC =Special Supplemental Nutrition Program for Women, Infants and Children; WIC-LARS=WIC-Linkage Annual Report Survey

**Table C-3. Outcomes reported from data sources**

| Data Source  | Author, Year                    | KQ    | Outcomes  |
|--|---------------------------------|-------|---|
| California Birth Cohort File                                     | Fingar, 2017 <sup>32</sup>      | KQ1   | Fetal death, still birth, and neonatal mortality<br>Infant low birth weight<br>Preterm birth  |
| California Office of State Health Planning and Development       | Baer, 2019 <sup>12</sup>        | KQ1   | Maternal healthcare utilization   |
|  | Hamad, 2019 <sup>42</sup>       | KQ1   | Infant low birth weight<br>Maternal morbidity<br>Maternal gestational weight gains<br>NICU admission and hospital length of stay<br>Preterm birth |
| CANDLE study   | Arons, 2016 <sup>11</sup>       | KQ2   | Child development: social   |
|  | Bolbocean, 2021 <sup>20</sup>   | KQ1&2 | Child development   |
|  | Guan, 2021 <sup>39</sup>        | KQ2   | Child anthropometric status or growth<br>Child development  |
|  | Hamad, 2019 <sup>43</sup>       | KQ1   | Breastfeeding<br>Diet quality: women  |
| Chicago Family Food Survey                                       | Odoms-Young, 2014 <sup>67</sup> | KQ1&2 | Diet quality: children<br>Intakes of food groups and selected nutrients: women  |
| Child Health Initiative for Lifelong Eating and Exercise (CHILE) | Morshed, 2015 <sup>64</sup>     | KQ2   | Intakes of food groups and selected nutrients: children   |

| <b>Data Source</b>                                    | <b>Author, Year</b>           | <b>KQ</b> | <b>Outcomes</b>  |
|---|-------------------------------|-----------|--|
| Children's HealthWatch                                | Rhee, 2019 <sup>74</sup>      | KQ1       | Infant low birth weight  |
|   | Black, 2012 <sup>19</sup>     | KQ2       | Child development<br>Child growth/anthropometric status<br>Morbidity |
| Early Childhood Longitudinal Study (ECLS-B)           | Jackson, 2015 <sup>49</sup>   | KQ2       | Academic achievement tests<br>Child development                      |
| Expanded Food and Nutrition Education Program (EFNEP) | Perkins, 2020 <sup>73</sup>   | KQ2       | Diet quality: women  |
| Feeding Infants and Toddlers Study                    | Guthrie, 2018 <sup>40</sup>   | KQ2       | Intakes of food groups and selected nutrients: children              |
|   | Guthrie, 2020 <sup>41</sup>   | KQ2       | Intakes of food groups and selected nutrients: children              |
|   | Jun, 2018 <sup>51</sup>       | KQ2       | Intakes of food groups and selected nutrients: children              |
|   | Kay, 2021 <sup>53</sup>       | KQ2       | Intakes of food groups and selected nutrients: children              |
| FoodAPS   | Fang, 2019 <sup>31</sup>      | KQ2       | Household purchasing/benefit redemption                              |
|   | Litvak, 2020 <sup>60</sup>    | KQ2       | Household purchasing/benefit redemptions                             |
|   | Stewart, 2019 <sup>83</sup>   | KQ2       | Household purchasing/benefit redemptions                             |
| Local WIC agencies 10 states                          | Wilde, 2012 <sup>95</sup>     | KQ1&2     | Breastfeeding  |
| Minnesota WIC   | McCoy, 2018 <sup>62</sup>     | KQ1&2     | Breastfeeding  |
| NAFTAN  | Ishdorj, 2013 <sup>48</sup>   | KQ2       | Intakes of food groups and selected nutrients: children              |
| National Consumer Panel                               | Oh, 2016 <sup>68</sup>        | KQ2       | Household purchasing/benefit redemption                              |
| National Immunization Survey                          | Zhang, 2021 <sup>96</sup>     | KQ1&2     | Breastfeeding  |
| National Immunization Survey Child (NIS-CHILD)        | Casillas, 2017 <sup>22</sup>  | KQ2       | Healthcare utilization   |
| New York PedNSS                                       | Lee, 2017 <sup>58</sup>       | KQ1&2     | Breastfeeding  |
| NHANES  | Barrera, 2018 <sup>13</sup>   | KQ2       | Introduction to solids   |
|   | Gu, 2017 <sup>38</sup>        | KQ2       | Diet quality: children   |
|   | Hamner, 2019 <sup>44</sup>    | KQ2       | Intakes of food groups and selected nutrients: children              |
|   | Li, 2019 <sup>59</sup>        | KQ1&2     | Breastfeeding  |
|   | Oberle, 2020 <sup>66</sup>    | KQ1       | Diet quality: women  |
|   | Tester, 2016 <sup>85</sup>    | KQ2       | Diet quality: children   |
|   | Vercammen, 2018 <sup>88</sup> | KQ2       | Intakes of food groups and selected nutrients: children              |
|   | Zimmer, 2019 <sup>97</sup>    | KQ1&2     | Intakes of food groups and selected nutrients: women and children    |
|   | Zimmer, 2020 <sup>98</sup>    | KQ1&2     | Intakes of food groups and selected nutrients: children              |
| Nielsen Homescan Panel                                | Ng, 2018 <sup>65</sup>        | KQ2       | Household purchasing/benefit redemptions                             |
| Nutrition Data System for Research                    | Thornton, 2014 <sup>87</sup>  | KQ2       | Intakes of food groups and selected nutrients: children              |



| Data Source   | Author, Year                   | KQ     | Outcomes   |
|---|--------------------------------|--------|--|
| NYS WIC administrative data   | Chiasson, 2016 <sup>28</sup>   | KQ2    | Child anthropometric status or growth  |
| PRAMS   | Kasim, 2021 <sup>52</sup>      | KQ1    | Maternal health behaviors  |
|   | Testa, 2020 <sup>84</sup>      | KQ1    | Infant low birth weight<br>Preterm birth   |
| PRAMS (South Carolina)  | Ma, 2014 <sup>61</sup>         | KQ1&2  | Breastfeeding  |
| PRAMS, NIS and the Ped-NSS  | Joyce, 2015 <sup>50</sup>      | KQ1&2  | Breastfeeding  |
| Primary (Atlanta)   | Meiqari, 2015 <sup>63</sup>    | KQ2    | Intakes of food groups and selected nutrients: children                                |
| Primary (Chicago)   | Kong, 2014 <sup>55</sup>       | KQ1 &2 | Diet quality: women and children   |
| Primary from LA   | Langellier, 2014 <sup>57</sup> | KQ1&2  | Breastfeeding  |
| Primary (location unknown)  | Lakshmanan, 2020 <sup>56</sup> | KQ2    | Child anthropometric status or growth<br>Child development                             |
| Public Health Foundation Enterprises (PHFE) WIC in Los Angeles County, California | Anderson, 2020 <sup>3</sup>    | KQ2    | Child anthropometric status or growth  |
|   | Anderson, 2020 <sup>4</sup>    | KQ2    | Child anthropometric status or growth  |
|   | Chaparro, 2019 <sup>23</sup>   | KQ2    | Child anthropometric status or growth  |
|   | Chaparro, 2019 <sup>24</sup>   | KQ2    | Child anthropometric status or growth  |
|   | Chaparro, 2020 <sup>25</sup>   | KQ2    | Child anthropometric status or growth  |
|   | Chaparro, 2020 <sup>26</sup>   | KQ2    | Child anthropometric status or growth  |
|   | Chaparro, 2020 <sup>27</sup>   | KQ2    | Child anthropometric status or growth  |
|   | Whaley, 2012 <sup>93</sup>     | KQ1&2  | Breastfeeding  |
| Puerto Rican Maternal and Infant Health Survey                                    | Oropesa, 2001 <sup>69</sup>    | KQ2    | Mortality  |
| Refugee Health Assessment Program   | Smock, 2020 <sup>79</sup>      | KQ2    | Anemia   |
| South Carolina Vital Statistics   | Bersak, 2018 <sup>16</sup>     | KQ2    | Healthcare utilization   |
|   | Bersak, 2021 <sup>17</sup>     | KQ1&2  | Breastfeeding  |
|   | Sonchak, 2016 <sup>80</sup>    | KQ1    | Infant low birth weight<br>NICU admission and hospital length of stay<br>Preterm birth |
|   | Sonchak, 2017 <sup>81</sup>    | KQ1&2  | Breastfeeding<br>Maternal gestational weight gains                                     |
| Multiple state WIC agencies   | Pan, 2016 <sup>70</sup>        | KQ2    | Child anthropometric status or growth  |
|   | Pan, 2019 <sup>71</sup>        | KQ2    | Child anthropometric status or growth  |
| Stillbirth Collaborative Research Network   | Angley, 2018 <sup>10</sup>     | KQ1    | Fetal death, still birth, and neonatal mortality                                       |
| Supermarket chain with over sixty stores in two New England states                | Andreyeva, 2013 <sup>5</sup>   | KQ2    | Household purchasing/benefit redemption  |
|   | Andreyeva, 2013 <sup>6</sup>   | KQ2    | Household purchasing/benefit redemption  |
|   | Andreyeva, 2014 <sup>7</sup>   | KQ2    | Household purchasing/benefit redemption  |
|   | Andreyeva, 2015 <sup>8</sup>   | KQ2    | Household purchasing/benefit redemption  |
|   | Andreyeva, 2016 <sup>9</sup>   | KQ2    | Household purchasing/benefit redemptions   |

| Data Source   | Author, Year                      | KQ       | Outcomes  |
|---|-----------------------------------|----------|---|
| Survey done by investigators, using PHFE list. Data not from PHFE | Whaley, 2012 <sup>94</sup>        | KQ1&2    | Intakes of food groups and selected nutrients: women and children |
| US Standard Certificate of Live Birth                             | Soneji, 2019 <sup>82</sup>        | KQ1&2    | Mode of Delivery  |
| WIC Client Information Management System (Washington DC)          | El-Bastawissi, 2007 <sup>30</sup> | KQ1      | Fetal death, still birth, and neonatal mortality                  |
| WIC Management Information System                                 | Freedman, 2017 <sup>33</sup>      | KQ2      | Child anthropometric status or growth                             |
|   | Gleason, 2011 <sup>34</sup>       | Grey Lit | Household purchasing/benefit redemptions                          |
|   | Pan, 2021 <sup>72</sup>           | KQ2      | Child anthropometric status or growth                             |
| WIC Infant and Toddler Feeding Practices Study 2                  | Gleason, 2020 <sup>35</sup>       | KQ1&2    | Breastfeeding   |
|   | Borger, 2020 <sup>21</sup>        | Grey Lit | Child anthropometric status or growth                             |
|   | Weinfield, 2019 <sup>90</sup>     | Grey Lit | Child anthropometric status or growth                             |
|   | Weinfield, 2020 <sup>91</sup>     | KQ2      | Diet quality: children  |
|   | Weinfield, 2020 <sup>92</sup>     | KQ2      | Diet quality: children  |
| WIC Participant and Program Characteristics (WIC-PC)              | Daepf, 2019 <sup>29</sup>         | KQ2      | Child anthropometric status or growth                             |
| WIC-LARS  | Thomas, 2014 <sup>86</sup>        | KQ2      | Healthcare utilization  |

CANDLE= Conditions Affecting Neurocognitive Development and Learning in Early Childhood; CDC=Centers for Disease Control and Prevention; DHEC=South Carolina Department of Health and Environmental Control; ECLS-B=Early Childhood Longitudinal Study, Birth Cohort; FITS=Feeding Infants and Toddlers Study; FoodAPS=National Household Food Acquisition and Purchase Survey; Grey Lit=Grey Literature; ITFPS-2=WIC Infant and Toddler Feeding Practices Study; KQ=Key Question; MIS=Management Information Systems; NATFAN=National Food and Nutrition Survey; NCES=National Center for Education Statistics; NCHS=National Center for Health Statistics; NHANES=National Health and Nutrition Examination Survey; NIS=National Immunization Survey; PedNSS=New York Pediatric Nutrition Surveillance System; PRAMS=Pregnancy Risk Assessment Monitoring System; USDA=United States Department of Agriculture; WebNEERS=Web-Based Nutrition Education Evaluation and Reporting System; WIC =Special Supplemental Nutrition Program for Women, Infants and Children; WIC-LARS=WIC-Linkage Annual Report Survey

## Adjusted Factors of Included Data

Many of the included studies adjusted for maternal socio-demographic characteristics, which include mother's age, education level, race and ethnicity, employment status, marital status, smoking, alcohol, and drug use, pre-pregnancy comorbidities, household income, immigration status, language preference, household size, and enrollment in other assistance programs. Common infant or child characteristics adjusted for were child's age, race and ethnicity, gender, neonatal conditions. There were common across most outcomes reported in the studies included in this report. In studies reporting household purchasing and WIC redemption, data adjusted for several additional factors, focusing on grocery expenditure, month of purchase, non-food EBT, receipt of cash assistance, SNAP, and WIC period. In addition, several studies included store specific factors such as number of transactions, average price of fruit and vegetables, socio-demographic of store area, store level variables.

**Table C-4. Adjusted Factors by outcomes and outcome domain**

| KQ  | Outcome Domain                   | Outcome   | Adjusted Factors  |
|-----|----------------------------------|---|---|
| KQ1 | Maternal health outcomes         | Maternal anemia                                 | No studies  |
|     |                                  | Maternal mortality                              | No studies  |
|     |                                  | Mode of delivery                                | No studies  |
|     |                                  | Maternal health behaviors                       | Age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, pre-pregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP   |
|     |                                  | Maternal healthcare utilization                 | Maternal age at delivery, education, smoking status, drug or alcohol abuse, mental illness  |
|     |                                  | Maternal morbidity                              | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth  |
|     |                                  | Maternal weight                                 | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth  |
| KQ1 | Neonatal and birth outcomes      | Fetal death, still birth and neonatal mortality | Maternal socio demographic and health characteristics, including: age, maternal education, pre-pregnancy obesity, drug use, preexisting diabetes, pregnancy history, smoking status, marital status   |
|     |                                  | NICU admission and hospital length of stay      | Child's gender, maternal age, education, race/ethnicity, parity, pre-pregnancy smoking, year of birth   |
|     |                                  | Preterm birth                                   | Maternal age at delivery, year of birth, smoking status, maternal education, income level, eclampsia, age, race, number of prior births, prenatal care, pre-pregnancy BMI, pre-pregnancy conditions (diabetes, hypertension etc.)   |
|     |                                  | Infant birth weight                             | Age, BMI, child gestational age and sex, maternal education, household income, infant year of birth, maternal marital status, race/ethnicity, number of prior births, pre-pregnancy smoking, state of residence   |
| KQ2 | Infant and child health outcomes | Anemia  | Caregiver sociodemographic characteristics and child age, breastfeeding history, and birth weight   |
|     |                                  | Healthcare utilization                          | Census region, child age category, child first born status, child race/ethnicity, child sex, child's birthweight, child's gender, diabetes, educational attainment, family income, gestational hypertension, health insurance, immunization facility, preterm birth and previous poor birth outcome, lives in state with childcare entry mandate, lives in state with school entry mandate, maternal age, maternal education, maternal marital status, number of children in the family, poverty status, pre-pregnancy diabetes and hypertension, pre-pregnancy smoking status, previous cesarean, vaginal bleeding |
|     |                                  | Morbidity                                       | Site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age  |
|     |                                  | Mortality                                       | Area poverty, prenatal care adequacy, prenatal care services, prenatal advice, method of payment, sociodemographic characteristics, clinical risk factors, receipt of prenatal care, maternal smoking, and gestational age at birth   |

| KQ            | Outcome Domain               | Outcome                               | Adjusted Factors   |
|---------------|------------------------------|---------------------------------------|--|
| KQ2           | Child growth and development | Child development                     | Child birth weight, caregiver education, caregiver employment, change in Medicaid status, child demographic (age, sex), food stamp participation, household income, household size, caregiver marital status, maternal age at birth, immigration status, maternal age, neonatal comorbidity, number of siblings, smoking during pregnancy, year of delivery, total number of pregnancies   |
|               |                              | Academic achievement tests            | Age in 2002, sex, race, number of kids in household, maternal education, marital status, mother employment status, household poverty ratio (at birth and 2001), other program participation, younger sibling   |
|               |                              | Child anthropometric status or growth | Race/ethnicity, age, mother's age, post-discharge diagnosis, birth weight, breastfeeding, caregiver education level, caregiver employment, child age, child race/ethnicity, child's initial WHZ, child's sex, educational attainment, family income, household income, household size, language, marital status, maternal education, maternal language preference, neonatal comorbidity, receipt of Medicaid during pregnancy, sex, total number of pregnancies, US born mother vs. immigrant, year of birth   |
| Breastfeeding | Breastfeeding                | Duration                              | Age, breastfeeding education/information received during pregnancy, child age, child gender, divorced/separated, father living in household, formula discharge pack at hospital, gestational diabetes, gestational hypertension, household income relative to the federal poverty standard, household size, income, infant gender, initiation of prenatal care, insurance (Medicaid or not), intention to breastfeed, interview language. Household size, level of education, low birthweight, marital status, maternal age, maternal drinking during last 3 months of pregnancy, maternal smoking during last 3 months of pregnancy, mother's race-ethnicity (Hispanic, number of years mother in WIC, preterm birth, previous live birth, program participation (SNAP and cash assistance), race/ethnicity, Region, trying to get pregnant, whether mother received WIC benefits |
|               |                              | Initiation                            | Maternal race, age, trying to get pregnant, maternal education, marital status, infant gender, maternal smoking during last 3 months of pregnancy, maternal drinking during last 3 months of pregnancy, previous live birth, breastfeeding education/information received during pregnancy, low birthweight, preterm birth, initiation of prenatal care, gestational diabetes, gestational hypertension  |
|               |                              | Ever/any breastfeeding                | Birth year, breastfeeding history, child age, child gender, CHIP/Children's Health Insurance, education, father living in household, formula discharge pack at hospital, household size, intention to breastfeed, interview language, maternal age, maternal marital status, mother living with the father of the baby, mother returned to work before the infant was 12 weeks old, mother's age at the birth of the infant, nativity status, number of years mother in WIC, poverty level, program enrollment rate, race/ethnicity, state unemployment rate, TANF/Temporary Assistance for Needy Families enrollment rate   |

| KQ   | Outcome Domain | Outcome                             | Adjusted Factors   |
|------|----------------|-------------------------------------|--|
|      |                | Exclusive breastfeeding             | Breastfeeding history, child age, child gender, education, ethnicity, father living in household, formula discharge pack at hospital, intention to bf, intention to breastfeed scale, interview language. Household size, maternal age, mother living with the father of the baby, mother's age at the birth of the infant, nativity status, number of years mother in WIC, poverty level (>130% or <130%), race, Race and child age, race/ethnicity, whether the mother returned to work before the infant was 12 weeks old   |
| Diet | Diet           | Diet quality                        | Age of the primary respondent, BMI status at 18 month f/u, acculturation status, breastfeeding duration in the first 13 months, child age when complementary foods were introduced, child gender, county, education, ever breastfed, fed poverty level, gender of the primary respondent, highest educational level in the household, highest grade achieved, hours spent in EFNEP, household food security status, household income, household size, households with one adult and living in urban settings, marital status, Maternal race/ethnicity, mother's education at baseline, overweight/obesity of the primary respondent, public assistance programs utilized, race/ethnicity, real monthly household income, rural/urban residence, SNAP receipt, total energy intake, total voucher amount per household, weight status and energy intake of the child, WIC participation status, year of participation   |
|      |                | Intake of food groups and nutrients | Acculturation status, age, age of the primary respondent, body mass index, breastfeeding, caregiver's age, caregiver's education, child age, child BMI category, child ethnicity and mother's education level, child race, child sex, duration household has been on WIC, employment, energy (total kilojoules), ever breastfed, food security, gender of the primary respondent, health insurance status, highest educational level in the household, household food security status, household size, households with one adult and living in urban settings, income-to-poverty, insurance status, language, language spoken at home, length of day at head start, marital status, maternal age, maternal education, maternal race/ethnicity, maternal smoking during pregnancy, NCI method, overweight/obesity, recruitment site (ITO vs. state), region, SNAP participation, total energy, total energy intake, total voucher amount per household, type of milk family would have consumed if using own money instead of WIC, WIC participation status |
|      |                | Household purchases                 | Average price of fruit/vegetable category, Bonferroni-adjusted for multiple comparisons, grocery expenditure, Inverse probability weighted regression adjustment estimation, Matching method, month of purchase, NCI Method, non-food EBT, number of transactions, receipt of cash assistance, SNAP, socio-demographic store area controls, state, store level socio-demographic variables, total grocery expenditure, WIC period  |

BMI = body mass index, CHIP = Children's Health Insurance Program, EBT = Electronic Benefit Transfer, EFNEP = Expanded Food and Nutrition Education Program, ITO = Indian Tribal Organization, KQ = Key Question; NCI = National Cancer Institute, SNAP = Supplemental Nutrition Assistance Program, TANF = Temporary Assistance for Needy Families, WHZ = weight-for-length/height z-score, WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

## Risk of Bias and Quality Assessment

Table C-5 and Table C-6 lists the included quantitative and qualitative articles, respectively, with the risk of bias and quality assessments. These were used as a component in the strength of evidence grading shown in the report.

**Table C-5. EPHPP risk of bias assessment of included studies**

| <b>Author, Year</b>               | <b>Selection Bias</b> | <b>Study Design</b> | <b>Confounders</b> | <b>Data Collection Method</b> | <b>Withdrawals and Drop-outs</b> | <b>Overall Rating</b> |
|-----------------------------------|-----------------------|---------------------|--------------------|-------------------------------|----------------------------------|-----------------------|
| Anderson, 2020 <sup>3</sup>       | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Anderson, 2020 <sup>4</sup>       | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Andreyeva, 2013 <sup>5</sup>      | Moderate              | Moderate            | Weak               | Strong                        | Weak                             | Weak                  |
| Andreyeva, 2013 <sup>6</sup>      | Strong                | Moderate            | Weak               | Moderate                      | Weak                             | Weak                  |
| Andreyeva, 2014 <sup>7</sup>      | Moderate              | Moderate            | Weak               | Strong                        | Weak                             | Weak                  |
| Andreyeva, 2015 <sup>8</sup>      | Moderate              | Moderate            | Weak               | Strong                        | Weak                             | Weak                  |
| Andreyeva, 2016 <sup>9</sup>      | Moderate              | Moderate            | Weak               | Strong                        | Weak                             | Weak                  |
| Angley, 2018 <sup>10</sup>        | Weak                  | Moderate            | Moderate           | Strong                        | Weak                             | Weak                  |
| Arons, 2016 <sup>11</sup>         | Moderate              | Moderate            | Strong             | Moderate                      | Weak                             | Moderate              |
| Baer, 2019 <sup>12</sup>          | Strong                | Moderate            | Weak               | Strong                        | Weak                             | Weak                  |
| Barrera, 2018 <sup>13</sup>       | Moderate              | Moderate            | Moderate           | Strong                        | Weak                             | Moderate              |
| Bersak, 2018 <sup>16</sup>        | Moderate              | Moderate            | Moderate           | Weak                          | Moderate                         | Moderate              |
| Bersak, 2021 <sup>17</sup>        | Strong                | Weak                | Strong             | Moderate                      | Weak                             | Weak                  |
| Black, 2012 <sup>19</sup>         | Moderate              | Weak                | Strong             | Weak                          | Weak                             | Weak                  |
| Bolbocean, 2021 <sup>20</sup>     | Weak                  | Moderate            | Moderate           | Moderate                      | Weak                             | Weak                  |
| Borger, 2020 <sup>21</sup>        | Strong                | Weak                | Strong             | Strong                        | Moderate                         | Moderate              |
| Casillas, 2017 <sup>22</sup>      | Moderate              | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| Chaparro, 2019 <sup>23</sup>      | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Chaparro, 2019 <sup>24</sup>      | Strong                | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Chaparro, 2020 <sup>25</sup>      | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Chaparro, 2020 <sup>26</sup>      | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Chaparro, 2020 <sup>27</sup>      | Strong                | Moderate            | Strong             | Moderate                      | Weak                             | Moderate              |
| Chiasson, 2016 <sup>28</sup>      | Moderate              | Moderate            | Moderate           | Weak                          | Moderate                         | Moderate              |
| Daepf, 2019 <sup>29</sup>         | Moderate              | Moderate            | Weak               | Strong                        | Weak                             | Moderate              |
| El-Bastawissi, 2007 <sup>30</sup> | Moderate              | Moderate            | Strong             | Weak                          | Weak                             | Weak                  |
| Fang, 2019 <sup>31</sup>          | Moderate              | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| Fingar, 2017 <sup>32</sup>        | Moderate              | Weak                | Strong             | Moderate                      | Strong                           | Moderate              |
| Freedman, 2017 <sup>33</sup>      | Strong                | Weak                | Strong             | Weak                          | Weak                             | Weak                  |
| Gleason, 2020 <sup>35</sup>       | Moderate              | Weak                | Moderate           | Strong                        | Weak                             | Weak                  |
| Gleason, 2011 <sup>34</sup>       | Moderate              | Moderate            | Weak               | Strong                        | Weak                             | Weak                  |
| Gu, 2017 <sup>38</sup>            | Strong                | Weak                | Weak               | Strong                        | Weak                             | Weak                  |
| Guan, 2021 <sup>39</sup>          | Weak                  | Moderate            | Moderate           | Strong                        | Strong                           | Moderate              |

| <b>Author, Year</b>             | <b>Selection Bias</b> | <b>Study Design</b> | <b>Confounders</b> | <b>Data Collection Method</b> | <b>Withdrawals and Drop-outs</b> | <b>Overall Rating</b> |
|---------------------------------|-----------------------|---------------------|--------------------|-------------------------------|----------------------------------|-----------------------|
| Guthrie, 2018 <sup>40</sup>     | Moderate              | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| Guthrie, 2020 <sup>41</sup>     | Strong                | Moderate            | Strong             | Weak                          | Moderate                         | Moderate              |
| Hamad, 2019 <sup>42</sup>       | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Hamad, 2019 <sup>43</sup>       | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Hamner, 2019 <sup>44</sup>      | Strong                | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| Ishdorj, 2013 <sup>48</sup>     | Moderate              | Moderate            | Strong             | Weak                          | Weak                             | Weak                  |
| Jackson, 2015 <sup>49a</sup>    | Moderate              | Moderate            | Strong             | Moderate                      | Weak                             | Moderate              |
| Jackson, 2015 <sup>49b</sup>    | Moderate              | weak                | Strong             | Moderate                      | Weak                             | weak                  |
| Joyce, 2015 <sup>50</sup>       | Moderate              | Moderate            | Strong             | Moderate                      | Weak                             | Moderate              |
| Jun, 2018 <sup>51</sup>         | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Kasim, 2021 <sup>52</sup>       | Moderate              | Weak                | Strong             | Strong                        | NA                               | Moderate              |
| Kay, 2021 <sup>53</sup>         | Moderate              | Moderate            | Moderate           | Moderate                      | Weak                             | Moderate              |
| Kong, 2014 <sup>55</sup>        | Moderate              | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Lakshmanan, 2020 <sup>56</sup>  | Moderate              | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| Langellier, 2014 <sup>57</sup>  | Strong                | Moderate            | Strong             | Moderate                      | Weak                             | Moderate              |
| Lee, 2017 <sup>58</sup>         | Strong                | Moderate            | Moderate           | Moderate                      | Weak                             | Moderate              |
| Li, 2019 <sup>59</sup>          | Moderate              | Moderate            | Strong             | Moderate                      | Weak                             | Moderate              |
| Litvak, 2020 <sup>60</sup>      | Strong                | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| Ma, 2014 <sup>61</sup>          | Moderate              | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| McCoy, 2018 <sup>62</sup>       | Weak                  | Weak                | Strong             | Weak                          | Moderate                         | Weak                  |
| Meiqari, 2015 <sup>63</sup>     | Moderate              | Weak                | Strong             | Weak                          | Moderate                         | Weak                  |
| Morshed, 2015 <sup>64</sup>     | Moderate              | Weak                | Strong             | Weak                          | Weak                             | Weak                  |
| Ng, 2018 <sup>65</sup>          | Weak                  | Moderate            | Strong             | Strong                        | Weak                             | Weak                  |
| Oberle, 2020 <sup>66</sup>      | Strong                | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| Odoms-Young, 2014 <sup>67</sup> | Moderate              | Moderate            | Weak               | Weak                          | Weak                             | Weak                  |
| Oh, 2016 <sup>68</sup>          | Weak                  | Weak                | Moderate           | Moderate                      | Weak                             | Weak                  |
| Oropesa, 2001 <sup>69</sup>     | Strong                | Weak                | Weak               | Weak                          | Weak                             | Weak                  |
| Pan, 2016 <sup>70</sup>         | Moderate              | Moderate            | Moderate           | Moderate                      | Moderate                         | Moderate              |
| Pan, 2019 <sup>71</sup>         | Moderate              | Moderate            | Moderate           | Moderate                      | Moderate                         | Moderate              |
| Pan, 2021 <sup>72</sup>         | Strong                | Weak                | Strong             | Weak                          | Weak                             | Weak                  |
| Perkins, 2020 <sup>73</sup>     | Weak                  | Weak                | Moderate           | Strong                        | Weak                             | Weak                  |
| Rhee, 2019 <sup>74</sup>        | Moderate              | Weak                | Strong             | Strong                        | Weak                             | Weak                  |
| Smock, 2020 <sup>79</sup>       | Moderate              | Moderate            | Moderate           | Strong                        | Weak                             | Moderate              |
| Sonchak, 2016 <sup>80</sup>     | Strong                | Moderate            | Moderate           | Strong                        | Weak                             | Weak                  |
| Sonchak, 2017 <sup>81</sup>     | Moderate              | Moderate            | Strong             | Moderate                      | Weak                             | Moderate              |
| Soneji, 2019 <sup>82</sup>      | Strong                | Moderate            | Strong             | Strong                        | Weak                             | Moderate              |
| Stewart, 2019 <sup>83</sup>     | Moderate              | Weak                | Moderate           | Strong                        | Weak                             | Weak                  |
| Testa, 2020 <sup>84</sup>       | Strong                | Weak                | Moderate           | Strong                        | Weak                             | Weak                  |

| Author, Year                  | Selection Bias | Study Design | Confounders | Data Collection Method | Withdrawals and Drop-outs | Overall Rating |
|-------------------------------|----------------|--------------|-------------|------------------------|---------------------------|----------------|
| Tester, 2016 <sup>85</sup>    | Moderate       | Moderate     | Strong      | Strong                 | Weak                      | Moderate       |
| Thomas, 2014 <sup>86</sup>    | Moderate       | Weak         | Strong      | Strong                 | Weak                      | Weak           |
| Thornton, 2014 <sup>87</sup>  | Moderate       | Weak         | Strong      | Strong                 | Weak                      | Weak           |
| Vercammen, 2018 <sup>88</sup> | Moderate       | Weak         | Strong      | Strong                 | Weak                      | Weak           |
| Weinfeld, 2019 <sup>90</sup>  | Strong         | Weak         | Strong      | Strong                 | Moderate                  | Moderate       |
| Weinfeld, 2020 <sup>92</sup>  | Moderate       | Moderate     | Strong      | Strong                 | Weak                      | Moderate       |
| Weinfeld, 2020 <sup>91</sup>  | Weak           | Moderate     | Strong      | Strong                 | Weak                      | Weak           |
| Whaley, 2012 <sup>93</sup>    | Strong         | Moderate     | Strong      | Moderate               | Weak                      | Moderate       |
| Whaley, 2012 <sup>94</sup>    | Moderate       | Moderate     | Strong      | Weak                   | Weak                      | Weak           |
| Wilde, 2012 <sup>95</sup>     | Moderate       | Moderate     | Strong      | Moderate               | Weak                      | Moderate       |
| Zhang, 2021 <sup>96</sup>     | Strong         | Moderate     | Strong      | Moderate               | Weak                      | Moderate       |
| Zimmer, 2019 <sup>97</sup>    | Moderate       | Moderate     | Strong      | Strong                 | Weak                      | Moderate       |
| Zimmer, 2020 <sup>98</sup>    | Strong         | Weak         | Strong      | Moderate               | Weak                      | Weak           |

EPHPP= Effective Public Health Practice Project; NA=not applicable

**Table C-6. Quality assessment of included qualitative studies using the Joanna Briggs Institute Checklist**

| Author, Year                           | Q1             | Q2  | Q3  | Q4  | Q5  | Q6  | Q7      | Q8  | Q9  | Q10 |
|--|----------------|-----|-----|-----|-----|-----|---------|-----|-----|-----|
| Almeida , 2020 <sup>1</sup>            | Yes            | Yes | Yes | Yes | Yes | No  | Unclear | Yes | Yes | Yes |
| Anderson , 2015 <sup>2</sup>           | Yes            | Yes | Yes | Yes | Yes | Yes | Yes     | Yes | Yes | Yes |
| Beck , 2014 <sup>14</sup>              | Yes            | Yes | Yes | Yes | Yes | No  | Yes     | Yes | Yes | Yes |
| Bedwell , 2017 <sup>15</sup>           | Yes            | Yes | Yes | Yes | Yes | No  | Yes     | Yes | Yes | Yes |
| Bertmann , 2014 <sup>18</sup>          | Yes            | Yes | Yes | Yes | Yes | No  | Yes     | Yes | Yes | Yes |
| Gross , 2015 <sup>36</sup>             | Yes            | Yes | Yes | Yes | Yes | Yes | Yes     | Yes | Yes | Yes |
| Gross, 2017 <sup>37</sup>              | Yes            | Yes | Yes | Yes | Yes | No  | Yes     | Yes | Yes | Yes |
| Hohl , 2016 <sup>45</sup>              | Yes            | Yes | Yes | Yes | Yes | Yes | Yes     | Yes | Yes | Yes |
| Hromi-Fiedler , 2016 <sup>46</sup>     | Yes            | Yes | Yes | Yes | Yes | Yes | Yes     | Yes | Yes | Yes |
| Isaacs, 2020 <sup>47</sup>             | Yes            | Yes | Yes | Yes | Yes | No  | Yes     | Yes | Yes | Yes |
| Kim, 2016 <sup>54</sup>                | Yes            | Yes | Yes | Yes | Yes | Yes | Yes     | Yes | Yes | Yes |
| Ruiz <sup>76</sup>                     | Yes            | Yes | Yes | No  | Yes | No  | No      | No  | Yes | No  |
| Schindler-Ruwisch , 2019 <sup>77</sup> | Yes            | Yes | Yes | Yes | Yes | No  | Yes     | Yes | Yes | Yes |
| Scott , 2016 <sup>78</sup>             | Yes            | Yes | Yes | Yes | Yes | Yes | Yes     | Yes | Yes | Yes |
| Weber , 2019 <sup>89</sup>             | Not applicable | Yes | Yes | Yes | Yes | No  | No      | Yes | Yes | Yes |

Q1 Is there congruity between the stated philosophical perspective and the research methodology?

Q2 Is there congruity between the research methodology and the research question or objectives?

Q3 Is there congruity between the research methodology and the methods used to collect data?



- Q4 Is there congruity between the research methodology and the representation and analysis of data?
- Q5 Is there congruity between the research methodology and the interpretation of results?
- Q6 Is there a statement locating the researcher culturally or theoretically?
- Q7 Is the influence of the researcher on the research, and vice- versa, addressed?
- Q8 Are participants, and their voices, adequately represented?
- Q9 Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?
- Q10 Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

## Grey Literature

We searched six websites thought to contain reports evaluating the associations of WIC participation and health outcomes [Table 1]. Reports were identified from the USDA websites and these were reviewed for relevant results; most of results from the identified reports had been published in the scientific literature and were included in the quantitative results. However, reports from two studies have not yet been published and the findings are summarized below with respect to specific outcomes.

**Table C-7. List of websites**

| Name  | Website   |
|---|---|
| Food and Nutrition Service -USDA                                  | <a href="https://www.fns.usda.gov/">https://www.fns.usda.gov/</a>   |
| Economic Research Services -USDA                                  | <a href="https://www.ers.usda.gov/">https://www.ers.usda.gov/</a>   |
| National WIC Association  | <a href="https://thewichub.org/">https://thewichub.org/</a>   |
| Mathematica   | <a href="https://www.mathematica.org/about-mathematica">https://www.mathematica.org/about-mathematica</a>   |
| Center on Budget and Policy Priorities                            | <a href="https://www.cbpp.org/research/topics/child-nutrition-and-wic">https://www.cbpp.org/research/topics/child-nutrition-and-wic</a>   |
| Behavioral Economics and Healthy Food Choice Research (BECR), UNC | <a href="https://hdpd.unc.edu/current-research/behavioral-economics-and-healthy-food-choice-research-becr/">https://hdpd.unc.edu/current-research/behavioral-economics-and-healthy-food-choice-research-becr/</a> |

## Infant and Toddler Feeding Practices Study – 2 (ITFPS-2)

The Infant and Toddler Feeding Practices Study – 2 (ITFPS-2) is a USDA-funded cohort study of the nutritional, health and developmental outcomes of children whose mothers were in WIC during the prenatal period and or who were enrolled in WIC within their first three months of life. Begun in 2013, the study recruited WIC participants (mothers) from 27 State agencies and 80 local agencies who could be interviewed in English or Spanish. The children will be followed until they are 72 months old, with up to 18 maternal (or primary caregiver) interviews. To date, outcomes have been assessed at delivery, one year, two years, three and four years; findings from these studies have been released as USDA reports, with the report at four years released in 2020. Findings from all but the 3-year<sup>90</sup> and most recent 4-year report<sup>21</sup> were published in the scientific literature and were identified and included in the SR. The relevant results for this SR focus on whether continued participation in WIC leads to better child diet and anthropometric outcomes.

## Child Anthropometric Outcomes

In the 3-year ITFPS-2 report, analyses indicate that continued WIC participation is not associated with overweight or obesity in children.<sup>90</sup> In the 3-year report, comparison are made of the anthropometric outcomes of children at 36 months who were or were not WIC participants at

24 months. In adjusted models, at 36 months, participation in WIC was positively but not statistically associated with overweight (85<sup>th</sup> to 95<sup>th</sup> p, or obesity > (BMIZ 85<sup>th</sup>-95<sup>th</sup> p, > 95<sup>th</sup> p, respectively) (1.47 (0.77-2.81) and 1.20 (0.72-2.01), respectively.<sup>90</sup> Numeric results are not provided in the year-4 report, but it is stated in the bivariate results that early feeding practices and lifestyle factors were the only factors associated with BMI at 4 years of age.<sup>21</sup>

## **Child Dietary Outcomes**

In the 4-year report, analyses are presented regarding the pattern of WIC participation/retention and child dietary outcomes at age 4.<sup>21</sup> Over time, 6 distinct patterns of participation were identified among 1130 subjects (weighted: 439,767): 1) year 1 only (9.7% (1.3)); 2) years 1-2 (10% (1.4)); 3) years 1-3 (9.7% (1.2)); 4) years 1-4 (12.3% (1.2)); 5) consistently (46.4% (3.0)); 6) intermittent (11.7% (1.1)). During analyses, results are compared with year 1 only. Children's diet quality, as measured by Healthy Eating Index (HEI-2015) scores, was positively associated with retention in the WIC program: children who participate with WIC over the first four years of the child's life have higher HEI-2015 total scores than those who leave WIC after the first year of life.<sup>21</sup> At 4 years, children who consistently participated had HEI-2015 scores 3.16 (p=0.002) and those who participated during years 1-4 had HEI-2015 scores 2.46 (p=0.027) higher than those participating in WIC during year 1 only. The HEI-2015 scores of those participating during years 1-3 (1.72, p=0.133), 1-2 (0.68 (p=0.48) or intermittently (0.48, p=0.70) were not statistically different from those in WIC during year 1 only.<sup>21</sup>

In the 4-year report, there are results regarding other aspects of diet. In these analyses, participation in WIC at 48 months is contrasted with participation in other programs such as SNAP. Multivariate regression analysis indicates that participation WIC associated with lower energy intake compared to those not in WIC or in SNAP (-67.85 kcal, p=0.0349). Children receiving WIC at 48 months were 1.315 (0.999, 1.731) more likely to meet the DGA recommendation for added sugars.<sup>21</sup> This is consistent with the 3-year report, which found that children in WIC at 24 months were more likely than children not receiving WIC at 24 months to meet the DGAs for added sugars at 36 months.<sup>90</sup>

There are mixed findings regarding WIC participation and reported consumption of other food groups. For example, at 36 months, children receiving WIC at 24 months were more likely to consume 100 percent fruit juice and low-fat milk, but less likely to consume any vegetable.

## **Benefit Redemption**

Gleason and Pooler (2011) reported the results of a USDA-funded study of WIC participant redemption patterns among Wisconsin WIC participants, one month prior to and then 6, 12 and 18 months after major food package changes were implemented in 2009.<sup>34</sup> Findings from this study provide insights regarding the impact of the WIC food package changes on benefit redemption as a measure of acceptance among approximately 126,850-116,956 WIC participants who were largely non-Hispanic White (45.85), Hispanic (25.25), and non-Hispanic Black (17.5%).

An examination of % participants who fully utilized their monthly benefits revealed a decline in %full use from 74.8% to 70.4% from baseline to 18 months post change, little change in % partial-use (19.7% and 19.3%, respectively) and a rise in % non-use from 5.5% to 10.3%. When examined by race/ethnicity, increases in non-use by 18 months were significant across all racial

and ethnic groups, but were largest amongst non-Hispanic American Indian/Alaska Native and non-Hispanic Black participants (16.5 and 14.3 percent, respectively;  $p < .0001$ ).<sup>34</sup> The increase in non-use was disproportionately greater among non-Hispanic blacks (6% versus 14.3%) than other groups. In adjusted analyses (adjusting for race and ethnicity, food package type, number of benefits issued), a trend for increased odds of non-use post package change was observed at 6 months (1.34 (1.30,1.39)), at 12 months (1.24 (1.20,1.28)), and at 18 months (1.71 (1.65,1.76)).<sup>34</sup>

When examining non-use by WIC participant category, %non-use at 18 months post-change was highest among Postpartum Women and Fully Breastfed Infants (ages 6–11 months) (20.2% and 19.5%, respectively), which for Postpartum Women was an +11.4% absolute increase;  $p < 0.0001$ ). Among children 1-4, %non-use nearly doubled from 5.8% to 11.4% ( $p < 0.0001$ ) as well as for Partially Breastfeeding Women and Pregnant Women.<sup>34</sup>

Overall, use of cash value vouchers (CVV) was high, but did decline from 77.8% participants at 6 months to 76.6% at 18 months post-change. Nearly all racial and ethnic groups saw an increase in both full use and non-use of CVVs from 6 to 18 months postimplementation. Hispanic participants saw the greatest increase in full use, from 53.0% to 56.9% percent ( $p < .0001$ ), followed by non-Hispanic participants of multiple races, from 35.4% to 38.0% ( $p < .05$ ), with small increases amongst other racial/ethnic groups.<sup>34</sup>

However, non-Hispanic American Indian/Alaska Natives saw the largest increase in %non-use of CVV from 6 to 18 months post change (31.6% to 36.2%;  $p < .01$ ), followed by non-Hispanic Asian/Pacific Islanders (from 10.3 to 12.8 percent;  $p < .001$ ), whereas no changes were observed for other groups. Increases in full CVV use were seen across participant categories, and for Children, Pregnant Women, and Postpartum Women there were slight increases in %non-use ( $p < .001$ ).<sup>34</sup>

## Store Purchasing

Using purchasing data from selected stores in Wisconsin, the extent to which participants made full redemptions of some specific foods, such as bean and peanut butter, milk, whole grains, and infant fruits and vegetables could be evaluated. Further they were able to evaluate whether households purchased more fruits and vegetables than that provided through the CVV.<sup>34</sup>

Redemption of most WIC foods did not change from baseline to 18 months. However, significant changes were observed for juice, milk, and beans. At 18 months post-change, 63.2% of WIC households purchased more fruits and vegetables than that provided by the CVV, up from 56.% at 6 months ( $p < .0001$ ). These increases were observed amongst Hispanic ( $p < .001$ ), non-Hispanic White ( $p < .0001$ ), and non-Hispanic Black households ( $p < .05$ ), but not amongst the other groups. Increases were greatest for participants who were children or pregnant women ( $p < .0001$  and  $p < .01$ , respectively).<sup>34</sup>

Overall, the authors concluded that WIC participant are quite accepting of the food package benefits provided by the program. There were some notable decreases in benefit redemption, including for some specific foods, and these negative effects were greater among some WIC subpopulations.

The references for the reports are listed. All available from USDA/FNS website.

Gleason, S and Pooler, J. *The Effects of Changes in WIC Food Packages on Redemptions*. Contractor and Cooperator Report No. 69, December 2011.  
<https://naldc.nal.usda.gov/download/50613/PDF>

#### ITFPS-2

Borger C, Zimmerman T, Vericker T, DeMatteis J, Gollapudi B, Whaley S, Ritchie L, Au L, Sallack L, May L. *WIC Infant and Toddler Feeding Practices Study-2: Fourth Year Report*. (2020). Alexandria, VA: Food and Nutrition Service, U.S. Department of Agriculture.  
<https://www.fns.usda.gov/wic/infant-and-toddler-feeding-practices-study-2-fourth-year-report>

Weinfield, N.S., Borger, C., Zimmerman, T., DeMatteis, J., MacAllum, C., Whaley, S., Ritchie, L., Au, L., Sallack, L., May, L. *WIC Infant and Toddler Feeding Practices Study-2: Third Year Report*. (2019). Alexandria, VA: Food and Nutrition Service, U.S. Department of Agriculture.  
<https://www.fns.usda.gov/wic/wic-infant-and-toddler-feeding-practices-study-2-third-year-report>

Borger, C., Weinfield, N.S., Zimmerman, T., McAllum C, DeMatteis, J., Whaley, S., Ritchie, L., Sallack, L., Au, L., Jenkins F., May, L. (2018). *WIC Infant and Toddler Feeding Practices Study-2: Second Year Report*. Alexandria, VA: Food and Nutrition Service, U.S. Department of Agriculture. <https://www.fns.usda.gov/wic/wic-infant-and-toddler-feeding-practices-study-2-second-year-report>

May, L., Borger, C., Weinfield, N., MacAllum, K., DeMatteis, J., McNutt, S., Whaley, S., Ritchie, L., and Sallack, L. (2017). *WIC infant and toddler feeding practices study – 2: Infant year report*. Alexandria, VA: Food and Nutrition Service, U.S. Department of Agriculture.  
<https://www.fns.usda.gov/wic/wic-infant-and-toddler-feeding-practices-study-2-infant-year-report>

May, L., Borger, C., McNutt, S., Harrison, G., Weinfield, N., MacAllum, C., and Montaquila, J. (2015). WIC ITFPS-2 infant report: Breastfeeding initiation. Alexandria, VA: Food and Nutrition Service, U.S. Department of Agriculture. <https://www.fns.usda.gov/wic/wic-infant-and-toddler-feeding-practices-study-2-infant-year-report>

May, L., Borger, C., McNutt, S., Harrison, G., Weinfield, N., MacAllum, C., and Montaquila, J. (2015). WIC ITFPS-2 infant report: Intention to breastfeed. Alexandria, VA: Food and Nutrition Service, U.S. Department of Agriculture. <https://www.fns.usda.gov/wic/special-supplemental-nutrition-program-women-infants-and-children-wic-infant-and-toddler-feeding>

## References for Appendix C

1. Almeida R, Alvarez Gutierrez S, Whaley SE, et al. A Qualitative Study of Breastfeeding and Formula-Feeding Mothers' Perceptions of and Experiences in WIC. *J Nutr Educ Behav*. 2020 Jun;52(6):615-25. doi: 10.1016/j.jneb.2019.12.006. PMID: 31955996.
2. Anderson CK, Walch TJ, Lindberg SM, et al. Excess Gestational Weight Gain in Low-Income Overweight and Obese Women: A Qualitative Study. *J Nutr Educ Behav*. 2015 Sep-Oct;47(5):404-11.e1. doi: 10.1016/j.jneb.2015.05.011. PMID: 26187348.
3. Anderson CE, Crespi CM, Wang MC, et al. The neighborhood food environment modifies the effect of the 2009 WIC food package change on childhood obesity in Los Angeles County, California. *BMC Public Health*. 2020 May 13;20(1):678. doi: 10.1186/s12889-020-08779-2. PMID: 32404069.
4. Anderson CE, Whaley SE, Crespi CM, et al. Every month matters: longitudinal associations between exclusive breastfeeding duration, child growth and obesity among WIC-participating children. *J Epidemiol Community Health*. 2020 Jul 1;doi: 10.1136/jech-2019-213574. PMID: 32611693.
5. Andreyeva T, Luedicke J. Federal food package revisions: effects on purchases of whole-grain products. *Am J Prev Med*. 2013 Oct;45(4):422-9. doi: 10.1016/j.amepre.2013.05.009. PMID: 24050418.
6. Andreyeva T, Luedicke J, Tripp AS, et al. Effects of reduced juice allowances in food packages for the women, infants, and children program. *Pediatrics*. 2013 May;131(5):919-27. doi: 10.1542/peds.2012-3471. PMID: 23629613.
7. Andreyeva T, Luedicke J, Henderson KE, et al. The positive effects of the revised milk and cheese allowances in the special supplemental nutrition program for women, infants, and children. *J Acad Nutr Diet*. 2014 Apr;114(4):622-30. doi: 10.1016/j.jand.2013.08.018. PMID: 24210878.
8. Andreyeva T, Luedicke J. Incentivizing fruit and vegetable purchases among participants in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Public Health Nutr*. 2015 Jan;18(1):33-41. doi: 10.1017/s1368980014000512. PMID: 24809502.
9. Andreyeva T, Tripp AS. The healthfulness of food and beverage purchases after the federal food package revisions: The case of two New England states. *Prev Med*. 2016 Oct;91:204-10. doi: 10.1016/j.ypmed.2016.08.018. PMID: 27527573.
10. Anglely M, Thorsten VR, Drews-Botsch C, et al. Association of participation in a supplemental nutrition program with stillbirth by race, ethnicity, and maternal characteristics. *BMC Pregnancy Childbirth*. 2018 Jul 24;18(1):306. doi: 10.1186/s12884-018-1920-0. PMID: 30041624.
11. Arons A, Bolbocean C, Bush NR, et al. Participation in the special supplemental nutrition program for women, infants, and children is not associated with early childhood socioemotional development: Results from a longitudinal cohort study. *Prev Med Rep*. 2016 Dec;4:507-11. doi: 10.1016/j.pmedr.2016.09.004. PMID: 27688993.
12. Baer RJ, Altman MR, Oltman SP, et al. Maternal factors influencing late entry into prenatal care: a stratified analysis by race or ethnicity and insurance status. *J Matern Fetal Neonatal Med*. 2019 Oct;32(20):3336-42. doi: 10.1080/14767058.2018.1463366. PMID: 29631462.

13. Barrera CM, Hamner HC, Perrine CG, et al. Timing of Introduction of Complementary Foods to US Infants, National Health and Nutrition Examination Survey 2009-2014. *J Acad Nutr Diet*. 2018 Mar;118(3):464-70. doi: 10.1016/j.jand.2017.10.020. PMID: 29307590.
14. Beck AL, Takayama JI, Halpern-Felsher B, et al. Understanding how Latino parents choose beverages to serve to infants and toddlers. *Matern Child Health J*. 2014 Aug;18(6):1308-15. doi: 10.1007/s10995-013-1364-0. PMID: 24077961.
15. Bedwell RM. The Impact of Federal Breastfeeding Policy Initiatives on Women's Breastfeeding Practices and Attitudes in Southern Indiana. *Journal of Poverty*. 2017;21(6):508-27. doi: 10.1080/10875549.2017.1348423.
16. Bersak T, Sonchak L. The Impact of WIC on Infant Immunizations and Health Care Utilization. *Health Serv Res*. 2018 Aug;53 Suppl 1(Suppl Suppl 1):2952-69. doi: 10.1111/1475-6773.12810. PMID: 29194615.
17. Bersak T, Sonchak-Ardan L. Marginal changes, marginal impacts: The limits of changes to WIC and their ability to influence breastfeeding rates. *Children & Youth Services Review*. 2021;126:N.PAG-N.PAG. doi: 10.1016/j.childyouth.2021.106043. PMID: 150850754. Language: English. Entry Date: 20210623. Revision Date: 20210623. Publication Type: Article.
18. Bertmann FM, Barroso C, Ohri-Vachaspati P, et al. Women, infants, and children cash value voucher (CVV) use in Arizona: a qualitative exploration of barriers and strategies related to fruit and vegetable purchases. *J Nutr Educ Behav*. 2014 May-Jun;46(3 Suppl):S53-8. doi: 10.1016/j.jneb.2014.02.003. PMID: 24809997.
19. Black MM, Quigg AM, Cook J, et al. WIC participation and attenuation of stress-related child health risks of household food insecurity and caregiver depressive symptoms. *Arch Pediatr Adolesc Med*. 2012 May;166(5):444-51. doi: 10.1001/archpediatrics.2012.1. PMID: 22566545.
20. Bolbocean C, Tylavsky FA. The impact of safety net programs on early-life developmental outcomes. *Food Policy*. 2021;100doi: 10.1016/j.foodpol.2020.102018.
21. Borger C, Zimmerman T, Vericker T, et al. WIC Infant and Toddler Feeding Practices Study-2: Fourth Year Report Food and Nutrition Service, U.S. Department of Agriculture. Alexandria, VA: 2020. <https://www.fns.usda.gov/wic/infant-and-toddler-feeding-practices-study-2-fourth-year-report>
22. Casillas SM, Bednarczyk RA. Missed Opportunities for Hepatitis A Vaccination, National Immunization Survey-Child, 2013. *J Pediatr*. 2017 Aug;187:265-71.e1. doi: 10.1016/j.jpeds.2017.04.001. PMID: 28483064.
23. Chaparro MP, Crespi CM, Anderson CE, et al. The 2009 Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food package change and children's growth trajectories and obesity in Los Angeles County. *Am J Clin Nutr*. 2019 May 1;109(5):1414-21. doi: 10.1093/ajcn/nqy347. PMID: 31011750.
24. Chaparro MP, Anderson CE, Crespi CM, et al. The effect of the 2009 WIC food package change on childhood obesity varies by gender and initial weight status in Los Angeles County. *Pediatr Obes*. 2019 Sep;14(9):e12526. doi: 10.1111/ijpo.12526. PMID: 30942561.
25. Chaparro MP, Anderson CE, Crespi CM, et al. The new child food package is associated with reduced obesity risk among formula fed infants participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in Los Angeles County, California, 2003-2016. *Int J Behav Nutr Phys Act*. 2020 Feb 10;17(1):18. doi: 10.1186/s12966-020-0921-3. PMID: 32041634.

26. Chaparro MP, Wang MC, Anderson CE, et al. The Association between the 2009 WIC Food Package Change and Early Childhood Obesity Risk Varies by Type of Infant Package Received. *J Acad Nutr Diet*. 2020 Mar;120(3):371-85. doi: 10.1016/j.jand.2019.09.014. PMID: 31831385.
27. Chaparro MP, Whaley SE, Anderson CE, et al. The role of income and neighbourhood poverty in the association between the 2009 Special Supplemental Nutrition Program for Women, Infants and Children (WIC) food package change and child obesity among WIC-participating children in Los Angeles County, 2003-2016. *Public Health Nutr*. 2020 Dec 22:1-8. doi: 10.1017/s1368980020005200. PMID: 33349277.
28. Chiasson MA, Scheinmann R, Hartel D, et al. Predictors of Obesity in a Cohort of Children Enrolled in WIC as Infants and Retained to 3 Years of Age. *J Community Health*. 2016 Feb;41(1):127-33. doi: 10.1007/s10900-015-0077-2. PMID: 26280211.
29. Daepf MIG, Gortmaker SL, Wang YC, et al. WIC Food Package Changes: Trends in Childhood Obesity Prevalence. *Pediatrics*. 2019 May;143(5)doi: 10.1542/peds.2018-2841. PMID: 30936251.
30. El-Bastawissi AY, Peters R, Sasseen K, et al. Effect of the Washington Special Supplemental Nutrition Program for Women, Infants and Children (WIC) on pregnancy outcomes. *Matern Child Health J*. 2007 Nov;11(6):611-21. doi: 10.1007/s10995-007-0212-5. PMID: 17562153.
31. Fang D, Thomsen MR, Nayga RM, Jr., et al. WIC Participation and Relative Quality of Household Food Purchases: Evidence from FoodAPS. *Southern Economic Journal*. 2019;86(1):83-105. doi: 10.1002/soej.12363.
32. Fingar KR, Lob SH, Dove MS, et al. Reassessing the Association between WIC and Birth Outcomes Using a Fetuses-at-Risk Approach. *Matern Child Health J*. 2017 Apr;21(4):825-35. doi: 10.1007/s10995-016-2176-9. PMID: 27531011.
33. Freedman DS, Sharma AJ, Hamner HC, et al. Trends in Weight-for-Length Among Infants in WIC From 2000 to 2014. *Pediatrics*. 2017 Jan;139(1)doi: 10.1542/peds.2016-2034. PMID: 27965380.
34. Gleason S, Pooler J. The Effects of Changes in WIC Food Packages on Redemptions. Contractor and Cooperator Report No. 69 Altarum Institute. 2011. <https://naldc.nal.usda.gov/download/50613/PDF>
35. Gleason S, Wilkin MK, Sallack L, et al. Breastfeeding Duration Is Associated With WIC Site-Level Breastfeeding Support Practices. *J Nutr Educ Behav*. 2020 Jul;52(7):680-7. doi: 10.1016/j.jneb.2020.01.014. PMID: 32171671.
36. Gross TT, Powell R, Anderson AK, et al. WIC peer counselors' perceptions of breastfeeding in African American women with lower incomes. *J Hum Lact*. 2015 Feb;31(1):99-110. doi: 10.1177/0890334414561061. PMID: 25480019.
37. Gross TT, Davis M, Anderson AK, et al. Long-Term Breastfeeding in African American Mothers. *J Hum Lact*. 2017 Feb;33(1):128-39. doi: 10.1177/0890334416680180. PMID: 28061039.
38. Gu X, Tucker KL. Dietary quality of the US child and adolescent population: trends from 1999 to 2012 and associations with the use of federal nutrition assistance programs. *Am J Clin Nutr*. 2017 Jan;105(1):194-202. doi: 10.3945/ajcn.116.135095. PMID: 27881390.
39. Guan A, Hamad R, Batra A, et al. The Revised WIC Food Package and Child Development: A Quasi-Experimental Study. *Pediatrics*. 2021 Feb;147(2)doi: 10.1542/peds.2020-1853. PMID: 33495370.
40. Guthrie JF, Catellier DJ, Jacquier EF, et al. WIC and non-WIC Infants and Children Differ in Usage of Some WIC-Provided Foods. *J Nutr*. 2018 Sep 1;148(suppl\_3):1547s-56s. doi: 10.1093/jn/nxy157. PMID: 30247584.

41. Guthrie JF, Anater AS, Hampton JC, et al. The Special Supplemental Nutrition Program for Women, Infants, and Children is Associated with Several Changes in Nutrient Intakes and Food Consumption Patterns of Participating Infants and Young Children, 2008 Compared with 2016. *J Nutr*. 2020 Nov 19;150(11):2985-93. doi: 10.1093/jn/nxaa265. PMID: 33024989.
42. Hamad R, Collin DF, Baer RJ, et al. Association of Revised WIC Food Package With Perinatal and Birth Outcomes: A Quasi-Experimental Study. *JAMA Pediatr*. 2019 Jul 1;173(9):845-52. doi: 10.1001/jamapediatrics.2019.1706. PMID: 31260072.
43. Hamad R, Batra A, Karasek D, et al. The Impact of the Revised WIC Food Package on Maternal Nutrition During Pregnancy and Postpartum. *Am J Epidemiol*. 2019 Aug 1;188(8):1493-502. doi: 10.1093/aje/kwz098. PMID: 31094428.
44. Hamner HC, Paolicelli C, Casavale KO, et al. Food and Beverage Intake From 12 to 23 Months by WIC Status. *Pediatrics*. 2019 Mar;143(3)doi: 10.1542/peds.2018-2274. PMID: 30733238.
45. Hohl S, Thompson B, Escareño M, et al. Cultural Norms in Conflict: Breastfeeding Among Hispanic Immigrants in Rural Washington State. *Maternal & Child Health Journal*. 2016;20(7):1549-57. doi: 10.1007/s10995-016-1954-8. PMID: 116170891. Language: English. Entry Date: 20160622. Revision Date: 20170703. Publication Type: Article.
46. Hromi-Fiedler A, Chapman D, Segura-Pérez S, et al. Barriers and Facilitators to Improve Fruit and Vegetable Intake Among WIC-Eligible Pregnant Latinas: An Application of the Health Action Process Approach Framework. *J Nutr Educ Behav*. 2016 Jul-Aug;48(7):468-77.e1. doi: 10.1016/j.jneb.2016.04.398. PMID: 27373861.
47. Isaacs S, Shriver L, Haldeman L. Qualitative analysis of maternal barriers and perceptions to participation in a federal supplemental nutrition program in rural appalachian North Carolina. *J Appalachian Health*. 2020;2(4):37-52. doi: doi.org/10.13023/jah.0204.06.
48. Ishdorj A, Capps Jr O. The effect of revised WIC food packages on native American children. *American Journal of Agricultural Economics*. 2013;95(5):1266-72. doi: 10.1093/ajae/aat030.
49. Jackson MI. Early childhood WIC participation, cognitive development and academic achievement. *Soc Sci Med*. 2015 Feb;126:145-53. doi: 10.1016/j.socscimed.2014.12.018. PMID: 25555255.
50. Joyce T, Reeder J. Changes in breastfeeding among WIC Participants following implementation of the new food package. *Matern Child Health J*. 2015 Apr;19(4):868-76. doi: 10.1007/s10995-014-1588-7. PMID: 25095768.
51. Jun S, Catellier DJ, Eldridge AL, et al. Usual Nutrient Intakes from the Diets of US Children by WIC Participation and Income: Findings from the Feeding Infants and Toddlers Study (FITS) 2016. *J Nutr*. 2018 Sep 1;148(9s):1567s-74s. doi: 10.1093/jn/nxy059. PMID: 29878136.
52. Kasim MT, Ukert B. The impact of WIC participation on tobacco use and alcohol consumption. *Contemporary Economic Policy*. 2021;39(3):608-25. doi: 10.1111/coep.12525.
53. Kay MC, Duffy EW, Harnack LJ, et al. Kay MC, Duffy EW, Harnack LJ, Anater AS, Hampton JC, Eldridge AL, Story M. Development and Application of a Total Diet Quality Index for Toddlers. *Nutrients*. 2021;13(6):1943. doi: 10.3390/nu13061943.
54. Kim LP, Koleilat M, Whaley SE. A Qualitative Study to Examine Perceptions and Barriers to Appropriate Gestational Weight Gain among Participants in the Special Supplemental Nutrition Program for Women Infants and Children Program. *J Pregnancy*. 2016;2016:4569742. doi: 10.1155/2016/4569742. PMID: 27403341.



55. Kong A, Odoms-Young AM, Schiffer LA, et al. The 18-month impact of special supplemental nutrition program for women, infants, and children food package revisions on diets of recipient families. *Am J Prev Med*. 2014 Jun;46(6):543-51. doi: 10.1016/j.amepre.2014.01.021. PMID: 24842730.
56. Lakshmanan A, Song AY, Flores-Fenlon N, et al. Association of WIC Participation and Growth and Developmental Outcomes in High-Risk Infants. *Clin Pediatr (Phila)*. 2020 Jan;59(1):53-61. doi: 10.1177/0009922819884583. PMID: 31672064.
57. Langellier BA, Chaparro MP, Wang MC, et al. The new food package and breastfeeding outcomes among women, infants, and children participants in Los Angeles County. *Am J Public Health*. 2014 Feb;104 Suppl 1(Suppl 1):S112-8. doi: 10.2105/ajph.2013.301330. PMID: 24354843.
58. Lee F, Edmunds LS, Cong X, et al. Trends in Breastfeeding Among Infants Enrolled in the Special Supplemental Nutrition Program for Women, Infants and Children - New York, 2002-2015. *MMWR Morb Mortal Wkly Rep*. 2017 Jun 16;66(23):610-4. doi: 10.15585/mmwr.mm6623a4. PMID: 28617769.
59. Li K, Wen M, Reynolds M, et al. WIC Participation and Breastfeeding after the 2009 WIC Revision: A Propensity Score Approach. *Int J Environ Res Public Health*. 2019 Jul 24;16(15)doi: 10.3390/ijerph16152645. PMID: 31344937.
60. Litvak J, Parekh N, Juul F, et al. Food assistance programs and income are associated with the diet quality of grocery purchases for households consisting of women of reproductive age or young children. *Prev Med*. 2020 Sep;138:106149. doi: 10.1016/j.ypmed.2020.106149. PMID: 32473261.
61. Ma X, Liu J, Smith M. WIC participation and breastfeeding in South Carolina: updates from PRAMS 2009-2010. *Matern Child Health J*. 2014 Jul;18(5):1271-9. doi: 10.1007/s10995-013-1362-2. PMID: 24057992.
62. McCoy MB, Geppert J, Dech L, et al. Associations Between Peer Counseling and Breastfeeding Initiation and Duration: An Analysis of Minnesota Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). *Matern Child Health J*. 2018 Jan;22(1):71-81. doi: 10.1007/s10995-017-2356-2. PMID: 28755046.
63. Meiqari L, Torre L, Gazmararian JA. Exploring the Impact of the New WIC Food Package on Low-Fat Milk Consumption Among WIC Recipients: A Pilot Study. *J Health Care Poor Underserved*. 2015 Aug;26(3):712-25. doi: 10.1353/hpu.2015.0092. PMID: 26320907.
64. Morshed AB, Davis SM, Greig EA, et al. Effect of WIC Food Package Changes on Dietary Intake of Preschool Children in New Mexico. *Health Behav Policy Rev*. 2015 Jan;2(1):3-12. doi: 10.14485/hbpr.2.1.1. PMID: 27668264.
65. Ng SW, Hollingsworth BA, Busey EA, et al. Federal Nutrition Program Revisions Impact Low-income Households' Food Purchases. *Am J Prev Med*. 2018 Mar;54(3):403-12. doi: 10.1016/j.amepre.2017.12.003. PMID: 29455757.
66. Oberle MM, Freese R, Shults J, et al. Impact of the 2009 WIC Food Package Changes on Maternal Dietary Quality. *Journal of Hunger and Environmental Nutrition*. 2020doi: 10.1080/19320248.2020.1724227.
67. Odoms-Young AM, Kong A, Schiffer LA, et al. Evaluating the initial impact of the revised Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food packages on dietary intake and home food availability in African-American and Hispanic families. *Public Health Nutr*. 2014 Jan;17(1):83-93. doi: 10.1017/s1368980013000761. PMID: 23544992.
68. Oh M, Jensen HH, Rahkovsky I. Did revisions to the wic program affect household expenditures on whole grains? *Applied Economic Perspectives and Policy*. 2016;38(4):578-98. doi: 10.1093/aep/pw020.

69. Oropesa RS, Landale NS, Dávila AL. Poverty, prenatal care, and infant health in Puerto Rico. *Soc Biol.* 2001 Spring-Summer;48(1-2):44-66. doi: 10.1080/19485565.2001.9989027. PMID: 12194447.
70. Pan L, Freedman DS, Sharma AJ, et al. Trends in Obesity Among Participants Aged 2-4 Years in the Special Supplemental Nutrition Program for Women, Infants, and Children - United States, 2000-2014. *MMWR Morb Mortal Wkly Rep.* 2016 Nov 18;65(45):1256-60. doi: 10.15585/mmwr.mm6545a2. PMID: 27855143.
71. Pan L, Freedman DS, Park S, et al. Changes in Obesity Among US Children Aged 2 Through 4 Years Enrolled in WIC During 2010-2016. *Jama.* 2019 Jun 18;321(23):2364-6. doi: 10.1001/jama.2019.5051. PMID: 31211336.
72. Pan L, Blanck HM, Galuska DA, et al. Changes in High Weight-for-Length among Infants Enrolled in Special Supplemental Nutrition Program for Women, Infants, and Children during 2010–2018. *Childhood Obesity.* 2021;17(6):408-19. doi: 10.1089/chi.2021.0055. PMID: 152009661. Language: English. Entry Date: 20210830. Revision Date: 20210830. Publication Type: Article.
73. Perkins S, Daley A, Yerxa K, et al. The Effectiveness of the Expanded Food and Nutrition Education Program (EFNEP) on Diet Quality as Measured by the Healthy Eating Index. *Am J Lifestyle Med.* 2020 May-Jun;14(3):316-25. doi: 10.1177/1559827619872733. PMID: 32477034.
74. Rhee J, Fabian MP, Ettinger de Cuba S, et al. Effects of Maternal Homelessness, Supplemental Nutrition Programs, and Prenatal PM(2.5) on Birthweight. *Int J Environ Res Public Health.* 2019 Oct 28;16(21)doi: 10.3390/ijerph16214154. PMID: 31661898.
75. Robson SM, DeLuccia R, Baker S, et al. Qualitative Research on the Real-Time Decision Making of WIC Participants While Food Shopping: Use of Think-Aloud Methodology. *J Acad Nutr Diet.* 2020 Jan;120(1):111-9. doi: 10.1016/j.jand.2019.05.009. PMID: 31307943.
76. Ruiz M, Arroyo H, Dávila Torres R, et al. Qualitative Study on WIC Program Strategies to Promote Breastfeeding Practices in Puerto Rico: What do Nutritionist/Dietician's [sic] Think? *Maternal & Child Health Journal.* 2011;15(4):520-6. doi: 10.1007/s10995-010-0592-9.
77. Schindler-Ruwisch J, Roess A, Robert RC, et al. Determinants of Breastfeeding Initiation and Duration Among African American DC WIC Recipients: Perspectives of Recent Mothers. *Womens Health Issues.* 2019 Nov-Dec;29(6):513-21. doi: 10.1016/j.whi.2019.07.003. PMID: 31409521.
78. Scott A, Shreve M, Ayers B, et al. Breast-feeding perceptions, beliefs and experiences of Marshallese migrants: an exploratory study. *Public Health Nutr.* 2016 Nov;19(16):3007-16. doi: 10.1017/s1368980016001221. PMID: 27230629.
79. Smock L, Martelon M, Metallinos-Katsaras E, et al. Recovery From Malnutrition Among Refugee Children Following Participation in the Special Supplemental Nutrition for Women, Infants, and Children (WIC) Program in Massachusetts, 1998-2010. *J Public Health Manag Pract.* 2020 Jan/Feb;26(1):71-9. doi: 10.1097/phh.0000000000000995. PMID: 30969273.
80. Sonchak L. The Impact of WIC on Birth Outcomes: New Evidence from South Carolina. *Matern Child Health J.* 2016 Jul;20(7):1518-25. doi: 10.1007/s10995-016-1951-y. PMID: 26976280.

81. Sonchak L. The impact of WIC on breastfeeding initiation and gestational weight gain: Case study of South Carolina Medicaid mothers. *Children and Youth Services Review*. 2017;79:115-25. doi: 10.1016/j.chilgyouth.2017.05.024.
82. Soneji S, Beltrán-Sánchez H. Association of Special Supplemental Nutrition Program for Women, Infants, and Children With Preterm Birth and Infant Mortality. *JAMA Netw Open*. 2019 Dec 2;2(12):e1916722. doi: 10.1001/jamanetworkopen.2019.16722. PMID: 31800070.
83. Stewart H, McLaughlin PW, Dong D, et al. WIC Households' Bread and Cold Cereal Purchases: When They Use Benefits Versus Paying Out of Pocket. *Am J Health Promot*. 2019 Jan;33(1):79-86. doi: 10.1177/0890117118778243. PMID: 29847997.
84. Testa A, Jackson DB. Incarceration Exposure During Pregnancy and Infant Health: Moderation by Public Assistance. *J Pediatr*. 2020 Jun 23doi: 10.1016/j.jpeds.2020.06.055. PMID: 32590000.
85. Tester JM, Leung CW, Crawford PB. Revised WIC Food Package and Children's Diet Quality. *Pediatrics*. 2016 May;137(5)doi: 10.1542/peds.2015-3557. PMID: 27244804.
86. Thomas TN, Kolasa MS, Zhang F, et al. Assessing immunization interventions in the Women, Infants, and Children (WIC) program. *Am J Prev Med*. 2014 Nov;47(5):624-8. doi: 10.1016/j.amepre.2014.06.017. PMID: 25217817.
87. Thornton HE, Crixell SH, Reat AM, et al. Differences in energy and micronutrient intakes among Central Texas WIC infants and toddlers after the package change. *J Nutr Educ Behav*. 2014 May-Jun;46(3 Suppl):S79-86. doi: 10.1016/j.jneb.2014.02.005. PMID: 24810001.
88. Vercammen KA, Moran AJ, Zatz LY, et al. 100% Juice, Fruit, and Vegetable Intake Among Children in the Special Supplemental Nutrition Program for Women, Infants, and Children and Nonparticipants. *Am J Prev Med*. 2018 Jul;55(1):e11-e8. doi: 10.1016/j.amepre.2018.04.003. PMID: 29776784.
89. Weber SJ, Wichelecki J, Chavez N, et al. Understanding the factors influencing low-income caregivers' perceived value of a federal nutrition programme, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). *Public Health Nutr*. 2019 Apr;22(6):1056-65. doi: 10.1017/s1368980018003336. PMID: 30522548.
90. Weinfield NS, Borger C, Zimmerman T, et al. WIC Infant and Toddler Feeding Practices Study-2: Third Year Report Food and Nutrition Service, U.S. Department of Agriculture. Alexandria, VA: 2019. <https://www.fns.usda.gov/wic/wic-infant-and-toddler-feeding-practices-study-2-third-year-report>
91. Weinfield NS, Borger C, Gola AA. Breastfeeding Duration in a Low-Income Sample Is Associated With Child Diet Quality at Age Three. *J Hum Lact*. 2020 Feb 24;890334420903029. doi: 10.1177/0890334420903029. PMID: 32091965.
92. Weinfield NS, Borger C, Au LE, et al. Longer Participation in WIC Is Associated with Better Diet Quality in 24-Month-Old Children. *J Acad Nutr Diet*. 2020 Jun;120(6):963-71. doi: 10.1016/j.jand.2019.12.012. PMID: 32067936.
93. Whaley SE, Koleilat M, Whaley M, et al. Impact of policy changes on infant feeding decisions among low-income women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Am J Public Health*. 2012 Dec;102(12):2269-73. doi: 10.2105/ajph.2012.300770. PMID: 23078467.

94. Whaley SE, Ritchie LD, Spector P, et al. Revised WIC food package improves diets of WIC families. *J Nutr Educ Behav*. 2012 May-Jun;44(3):204-9. doi: 10.1016/j.jneb.2011.09.011. PMID: 22406013.
95. Wilde P, Wolf A, Fernandes M, et al. Food-package assignments and breastfeeding initiation before and after a change in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Am J Clin Nutr*. 2012 Sep;96(3):560-6. doi: 10.3945/ajcn.112.037622. PMID: 22836028.
96. Zhang Q, Chen C, Xue H, et al. Revisiting the Relationship between WIC Participation and Breastfeeding among Low-Income Children in the U.S. after the 2009 WIC Food Package Revision. *Food Policy*. 2021 May;101doi: 10.1016/j.foodpol.2021.102089. PMID: 34054198.
97. Zimmer MC, Vernarelli JA. Changes in nutrient and food group intakes among children and women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children: findings from the 2005-2008 and 2011-2014 National Health and Nutrition Examination Surveys. *Public Health Nutr*. 2019 Dec;22(18):3309-14. doi: 10.1017/s1368980019002702. PMID: 31566166.
98. Zimmer MC, Vernarelli JA. Select Food Group Intake of US Children Aged 2 to 4 Years by WIC Participation Status and Income. *J Acad Nutr Diet*. 2020 Dec;120(12):2032-8.e1. doi: 10.1016/j.jand.2020.07.027. PMID: 33222884.

## Appendix D. Evidence Tables

**Evidence Table D-1. Study characteristics of studies included in Key Question 1 investigating the association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Study Name                                | Study Design         | Study Purpose  | Data Source         | Data Collection Years | Eligibility Criteria  |
|--------------------------|---|----------------------|--|---------------------|-----------------------|---|
| Angle, 2018 <sup>1</sup> | Stillbirth Collaborative Research Network | Case-control         | Examine if an association of WIC with lower risk of stillbirth would differ by race/ethnicity because of factors associated with WIC participation that confound the association | Primary             | 2006 to 2008          | Women who had experienced a fetal death (case) at $\geq 18$ weeks of clinical gestational age, or delivered a live birth (control) at $\geq 20$ weeks gestation at one of the participating site hospitals. She was subsequently excluded if there was evidence that clearly estimated the gestational age at $\leq 196$ weeks or if the delivery resulted from termination of a living fetus. For the case-control study, the woman was required to be at least 13 years of age, a physical resident at the time of delivery within one of the geographic catchment areas and identified for participation prior to hospital discharge. Women were excluded if incarcerated, or if informed consent (and assent if applicable) could not be administered due to mental status or a language barrier. |
| Baer, 2019 <sup>2</sup>  | NR  | Retrospective cohort | Examine factors influencing late (>sixth month of gestation) entry into prenatal care by race/ethnicity and insurance payer.   | Birth/death records | 2007 to 2012          | The study population was drawn from live births in California from 2007 through 2012 (n=3,160,268). The population was restricted to singletons contained in a birth cohort file maintained by the California Office of Statewide Health Planning and Development who were born between 20 and 44 weeks gestation (n=2,963,888).  |

| Author, Year                     | Study Name | Study Design         | Study Purpose  | Data Source         | Data Collection Years | Eligibility Criteria   |
|----------------------------------|------------|----------------------|--|---------------------|-----------------------|--|
| Bersak, 2021 <sup>3</sup>        | NR         | Before-after         | To investigate whether the 2009 revisions to the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) food packages had a positive effect on breastfeeding initiation rates.                                   | Birth/death records | 2004 to 2013          | All births paid by Medicaid from 2004 to 2013 in South Carolina  |
| Bolbocean, 2021 <sup>4</sup>     | NR         | Prospective cohort   | Uses novel data to estimate the impact of the Women, Infants and Children (WIC), the Supplemental Nutrition Assistance Program (SNAP) and home visitation (HV) programs on cognitive and language outcomes in children up to 24 months | CANDLE study        | 2004 to 2013          | All births paid by Medicaid from 2004 to 2013 in South Carolina  |
| El-Bastawissi, 2007 <sup>5</sup> | NR         | Retrospective cohort | To determine the effect of the Washington State Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) on adverse pregnancy outcomes.   | Birth/death records | 1999 to 2001          | WIC: Were pregnant, had singleton birth, and enrolled in Washington WIC between Sept. 1, 1999 and Dec. 31, 2000, had a live birth between Sept. 1, 1999 and Oct. 15, 2001, and were on Medicaid AND were able to be matched from the WIC records into the Department of Health Records. / Non-WIC: Women who had a birth or fetal death during the same time period, who did not match to WIC records, and who were on Medicaid. |

| Author, Year               | Study Name   | Study Design         | Study Purpose  | Data Source   | Data Collection Years | Eligibility Criteria   |
|----------------------------|--|----------------------|--|---------------|-----------------------|--|
| Fingar, 2017 <sup>6</sup>  | NR   | Retrospective cohort | Examine the association between WIC and preterm birth (PTB), low birth weight (LBW), and perinatal death (PND) using a fetuses-at-risk approach.   | State surveys | 2010 to 2010          | California resident women with a live birth or fetal death who were eligible for WIC via Medi-Cal, California's Medicaid program   |
| Gleason, 2020 <sup>7</sup> | WIC Infant and Toddler Feeding Practices Study-2   | Prospective cohort   | To describe breastfeeding support features of 80 WIC sites randomly selected to participate and examine site-level predictors of duration of any breastfeeding and fully breastfeeding among infants served at these sites | Primary       | 2013 to 2013          | Sites included in the study had to enroll a minimum of 30 study-eligible participants per month and recruited mothers needed to be at least 16 years old and able to complete the interviews in either English or Spanish. |
| Hamad, 2019 <sup>8</sup>   | Conditions Affecting Neurocognitive Development and Learning in Early Childhood (CANDLE) | Retrospective cohort | Examining impact of revised WIC food package on maternal nutrition during pregnancy/postpartum   | Primary       | 2006 to 2011          | Pregnant women in Memphis, Tennessee enrolled in CANDLE study with valid data  |
| Kasim, 2021 <sup>9</sup>   | NR   | Retrospective cohort | To investigate the effects of participation in the WIC program on cigarette and alcohol consumption.   | PRAMS         | 1992 to 2013          | Women whose deliveries were paid for by Medicaid and for whom WIC information was available.   |

| Author, Year              | Study Name | Study Design         | Study Purpose   | Data Source                               | Data Collection Years | Eligibility Criteria   |
|---------------------------|------------|----------------------|---|---|-----------------------|--|
| Ma, 2014 <sup>10</sup>    | NR         | Cross-sectional      | To understand the role of WIC participation and poverty level in breastfeeding initiation and duration in South Carolina.   | PRAMS                                     | 2009 to 2010          | A total of 2,100 women out of 3917 live births completed a SC PRAMS survey in 2009-2010. Exclusion: mothers whose infants died before the interview (N=178), and who had missing information on breastfeeding initiation (N=55), WIC participation (N=37) and income (N=34). Thus, we included 1,796 mothers in the analysis for breastfeeding initiation ... For breastfeeding duration analyses, a total of 1,346 mothers were included after excluding 427 mothers who did not initiate breastfeeding and 23 mothers with missing information on the duration of breastfeeding. |
| McCoy, 2018 <sup>11</sup> | NR         | Retrospective cohort | To identify associations between Minnesota WIC Peer Breastfeeding Support Program services and breastfeeding initiation and continuation.   | Minnesota WIC information system          | 2012 to 2012          | Women who gave birth in 2012 and accepted a peer counseling (PC) program referral prenatally.  |
| Rhee, 2019 <sup>12</sup>  | NR         | Cross-sectional      | to examine the independent effects of prenatal maternal homelessness, WIC participation during pregnancy, and fine particulate matter (PM2.5) on birthweight in a cohort of low-income urban children in Boston | Boston-based Children'sHealthWatch cohort | 2007 to 2015          | Caregiver's child age $\leq$ 48 months; residency in Massachusetts; caregiver ability to speak English or Spanish; respondent living in the child's household  |



| Author, Year                | Study Name | Study Design         | Study Purpose  | Data Source  | Data Collection Years | Eligibility Criteria   |
|-----------------------------|------------|----------------------|--|--|-----------------------|--|
| Sonchak, 2016 <sup>13</sup> | NR         | Cross-sectional      | To reexamine the effects of pregnancy WIC participation on a wide range of birth outcomes among Medicaid mothers, using recent and unique panel data from South Carolina Vital Statistics  | Vital Statistics Natality Data from South Carolina                   | 2004 to 2012          | Women between 15-45 years of age who had at least 2 live births during 2004-2012, birthweights between 400-6000g, gestation between 20-45 weeks, of Black or white race, who were on Medicaid for all pregnancies but switched WIC status.                 |
| Sonchak, 2017 <sup>14</sup> | NR         | Retrospective cohort | Estimate the effect of the WIC on breastfeeding initiation at hospital discharge and gestational weight gain, by relying on South Carolina birth certificates data for 2004–2013   | South Carolina Department of Health and Environmental Control (DHEC) | 2004 to 2013          | South Carolina mothers who had their deliveries paid for by Medicaid, and who subsequently remained eligible for WIC throughout multiple pregnancies.  |
| Soneji, 2019 <sup>15</sup>  | NR         | Retrospective cohort | To assess the association of WIC program participation during pregnancy by low-income expectant mothers covered by Medicaid with infant mortality by gestational age at birth and by maternal race/ethnicity in comparison with their counterparts who did not receive WIC benefits. | Birth/death records  | 2011 to 2017          | Data were from 11 148 261 expectant mothers who delivered live births in states that have implemented the 2003 revision of the US live birth certificate and whose insurance coverage and receipt of WIC benefits were recorded on the birth certificates. |

| Author, Year              | Study Name | Study Design         | Study Purpose  | Data Source                         | Data Collection Years | Eligibility Criteria   |
|---------------------------|------------|----------------------|--|-------------------------------------|-----------------------|--|
| Testa, 2020 <sup>16</sup> | NR         | Cross-sectional      | To assess if public assistance (WIC, Medicaid or both), modified the relationship between incarceration and low birth weight, very low birth weight, preterm birth, and very preterm birth   | PRAMS                               | 2009 to 2017          | The sample was restricted to states that included questions on incarceration history, birth weight, and gestational age, as well as relevant covariates.   |
| Zhang, 2021 <sup>17</sup> | NR         | Retrospective cohort | This paper applied an instrumental variable (IV) approach on a large, nationally representative survey sample of children, the National Immunization Surveys (NIS), to examine the relationship between WIC participation and breastfeeding among children born between 2005 and 2014. | National Immunization Surveys (NIS) | 2006 to 2016          | All children who were born in the years from 2005 to 2014 into households with income below or equal to 230% of the FPL, but they also took other cuts of the FPL to further restrict with respect to income |

CANDLE= Conditions Affecting Neurocognitive Development and Learning in Early Childhood; EFNEP=Expanded Food and Nutrition Education Program; FoodAPS= National Household Food Acquisition and Purchase Survey; FPL=federal poverty level; HEI=Healthy Eating Index; LBW=low birth weight; Medi-Cal=California Medicaid program; NASEM=National Academies of Sciences, Engineering, and Medicine; NHANES=National Health and Nutrition Examination Survey; NR=not reported; PC=peer counseling; PFP=Nutritional Profile of Packaged Food Purchases; PND=perinatal death; PRAMS=Pregnancy Risk Assessment Monitoring System; PTB=preterm birth; SNAP=Supplemental Nutrition Assistance Program; SSB=sugar sweetened beverage; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-2. Study characteristics of studies included in Key Question 1 investigating the association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Study Name | Study Design                 | Study Purpose   | Data Source        | Data Collection Years             | Eligibility Criteria   |
|----------------------------|------------|------------------------------|---|--------------------|-----------------------------------|--|
| Hamad, 2019 <sup>18</sup>  | NR         | Pre-post; quasi-experimental | To investigate whether the revised WIC food package improved perinatal and birth outcomes among recipients  | Birth certificates | 2007 to 2012                      | California singleton infants live-born from 2007 to 2012 with a gestational age of 20 to 44 weeks at delivery  |
| Kong, 2014 <sup>19</sup>   | NR         | Before-after                 | To examine the longer-term impact of the 2009 WIC food package change on nutrient and food group intake and overall diet quality among African American and Hispanic WIC child participants and their mothers/caregivers.   | Primary            | summer 2009 to winter/spring 2011 | Parent-child dyads were eligible for the longitudinal study if the child was aged between 2 and 3.5 years at baseline and participating in WIC. This age range was chosen to ensure that the child would be eating solid foods and would still be eligible for WIC (<5 years old) at the 18-month visit. Parents or guardians with a child enrolled in WIC were eligible if they were fluent in either English or Spanish. |
| Oberle, 2020 <sup>20</sup> | NHANES     | Pre-post                     | "The objective of this study was to evaluate the impact of the 2009 WIC changes, specifically the addition of vegetable and fruit vouchers, whole grains, reduced-fat milk, and milk substitutes in the maternal WIC food packages, on the diets of women directly receiving WIC benefits." | NHANES             | 2003-2006 to 2011-2014            | "Participants included low-income women of childbearing age (ages 18 to 40 years, incomes ≤185% FPL) who were receiving WIC themselves. WIC status was determined by an affirmative answer to the question, "Are you now receiving benefits from the WIC Program?" Women were excluded if they were not receiving WIC themselves, even if their children or other household members were WIC recipients."                  |

| Author, Year               | Study Name | Study Design | Study Purpose   | Data Source   | Data Collection Years | Eligibility Criteria   |
|----------------------------|------------|--------------|---|---------------|-----------------------|--|
| Whaley, 2012 <sup>21</sup> | NR         | Pre-post     | Explore the impact of the new WIC food package on WIC participant consumption of fruit, vegetables, wholegrain food, and lower-fat milk | State surveys | 2009 to 2010          | California WIC Participants who received WIC services (N > 800,000) in July, 2009 (prior to the food package change) and in January, 2010 (after the food package change). Respondents were either pregnant or postpartum women, or the parent of a child (0-5 years old) enrolled in WIC. |

CANDLE= Conditions Affecting Neurocognitive Development and Learning in Early Childhood; EFNEP=Expanded Food and Nutrition Education Program; FoodAPS= National Household Food Acquisition and Purchase Survey; FPL=federal poverty level; HEI=Healthy Eating Index; LBW=low birth weight; Medi-Cal=California Medicaid program; NASEM=National Academies of Sciences, Engineering, and Medicine; NHANES=National Health and Nutrition Examination Survey; NR=not reported; PC=peer counseling; PFP=Nutritional Profile of Packaged Food Purchases; PND=perinatal death; PRAMS=Pregnancy Risk Assessment Monitoring System; PTB=preterm birth; SNAP=Supplemental Nutrition Assistance Program; SSB=sugar sweetened beverage; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-3. Study characteristics of studies included in Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                  | Study Name | Study Design       | Study Purpose   | Data Source         | Data Collection Years  | Eligibility Criteria  |
|-------------------------------|------------|--------------------|---|---------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR         | Prospective cohort | Examining the healthfulness of the total product basket purchased by WIC-participating households after implementation of the WIC food package revisions in Connecticut and Massachusetts                           | Supermarket         | 2009 to 2010   | Low-income households that used supermarket loyalty cards and WIC benefits when shopping at the grocery chain in January 2009–December 2010.  |
| Arons, 2016 <sup>23</sup>     | NR         | Prospective cohort | "...we aim to clarify whether WIC is a potentially effective intervention for improving early childhood socioemotional development and reducing racial disparities in that domain."                                 | Primary             | 2006 to 2011   | 1503 mother-child dyads; included in this study are those eligible for Medicaid participation in Shelby County TN   |
| Barrera, 2018 <sup>24</sup>   | NR         | Cross-sectional    | To provide a nationally representative estimate of timing of introduction of complementary food and describe predictors of early (<4 months) intro of complementary foods   | NHANES              | 2009 to 2014   | Children ages 6 to 36 months of age who were NHANES participants, who had been introduced to complementary foods no later than 12 months of age and for whom data regarding complementary food initiation was available   |
| Bersak, 2018 <sup>25</sup>    | NR         | Prospective cohort | To test how prenatal participation in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) impacts health care utilization and immunizations within the first year of an infant's life. | Birth/death records | birth certificates 2004<br>Medicaid claims 2004 to birth certificates 2012<br>Medicaid claims 2013 | 312,727 observations of Medicaid eligible mother–infant pairs, which represent all Medicaid eligible infants over the study time frame. To ensure that we observe future medical care, we restricted our sample to infants eligible for Medicaid for at least 11 months, which excludes 15,211 observations, and to mothers between 15 and 45 years of age, which excludes a further 889 observations. We also eliminate observations with missing values of maternal WIC participation (4,907 observations), child birthweight (46 observations), child gender (three observations), and individuals with no observed Medicaid claims in the first year of life (1,294 observations), leaving us with a final unit of analysis of 290,377 observations (208,950 mothers) that is linked with Medicaid claims data. |

| Author, Year                 | Study Name | Study Design         | Study Purpose   | Data Source                        | Data Collection Years | Eligibility Criteria   |
|------------------------------|------------|----------------------|---|------------------------------------|-----------------------|--|
| Black, 2012 <sup>26</sup>    | NR         | Cross-sectional      | Testing two hypotheses: "...that children experiencing both household food insecurity and caregiver depressive symptoms are more likely to have negative health indicators than children experiencing 1 or neither stressor. The second was that WIC participation attenuates the negative relationship between household food insecurity and maternal depressive symptoms with child health indicators." | Primary                            | 2000 to 2010          | During times of peak flow, interviewers approached caregivers (primarily mothers) of children younger than 36 months seeking medical services from emergency departments or primary care. Caregivers of critically ill or injured children were not approached. Caregiver eligibility included ability to speak English, Spanish, or (in Minneapolis only) Somali, state residency, and knowledge about the child's household. |
| Bolbocean, 2021 <sup>4</sup> | NR         | Prospective cohort   | Uses novel data to estimate the impact of the Women, Infants and Children (WIC), the Supplemental Nutrition Assistance Program (SNAP) and home visitation (HV) programs on cognitive and language outcomes in children up to 24 months  | CANDLE study                       | 2004 to 2013          | All births paid by Medicaid from 2004 to 2013 in South Carolina  |
| Casillas, 2017 <sup>27</sup> | NR         | Cross-sectional      | To quantify number of missed opportunities for vaccination with Hep A vaccine in children and assess association of missed opportunities for Hep A vaccination with covariates of interest  | National Immunization Survey Child | 2013 to 2013          | US children ages 19-35 months whose caregivers participated in the National Immunization Survey and for whom there was provider verified vaccination history   |
| Fang, 2019 <sup>28</sup>     | NR         | Retrospective cohort | Examine the effect of the WIC on the quality of household food purchases using the National Household Food Acquisition and Purchase Survey (FoodAPS) and propensity score matching  | FoodAPS                            | 2012 to 2013          | households with at least one member who was categorically eligible for WIC and who met other program requirements for income or adjunctive eligibility through participation in Medicaid or other qualifying assistance program and households with at least one food-at-home event during the interview period  |

| Author, Year                | Study Name   | Study Design    | Study Purpose  | Data Source           | Data Collection Years | Eligibility Criteria   |
|-----------------------------|--|-----------------|--|-----------------------|-----------------------|--|
| Gu, 2017 <sup>29</sup>      | NR   | Cross-sectional | To investigate dietary quality trends from 1999 to 2012 in the U.S. child and adolescent population and their associations with socioeconomic status and participation in federal food assistance programs.            | NHANES                | 1999 to 2012          | We used data from the NHANES from 1999 through 2012 ... This study included a nationally representative sample of 38,487 children and adolescents, aged 2-18y, in the United States. ... Subjects who received WIC in the past 12 months of the survey were considered to be WIC participants. We restricted our analysis of WIC participation to participants aged 2-5 y who were living in households with a PIR <1.85 (n=6151). |
| Gu, 2017 <sup>29</sup>      | NR   | Cross-sectional | To investigate dietary quality trends from 1999 to 2012 in the U.S. child and adolescent population and their associations with socioeconomic status and participation in federal food assistance programs.            | NHANES                | 1999 to 2012          | We used data from the NHANES from 1999 through 2012 ... This study included a nationally representative sample of 38,487 children and adolescents, aged 2-18y, in the United States. ... Subjects who received WIC in the past 12 months of the survey were considered to be WIC participants. We restricted our analysis of WIC participation to participants aged 2-5 y who were living in households with a PIR <1.85 (n=6151). |
| Guan, 2021 <sup>30</sup>    | Conditions Affecting Neurocognitive Development and Learning in Early Childhood (CANDLE) study | Before-after    | Using quasi-experimental difference-in-differences analysis, we compared measures of growth, cognitive, and socioemotional development between WIC recipients and non-recipients before and after the policy revision. | Primary: CANDLE study | 2006 to 2011          | Participants in the CANDLE study who had valid data collected on these outcomes  |
| Guthrie, 2018 <sup>31</sup> | The Feeding Infants and Toddlers Study (FITS)  | Cross-sectional | The purpose of this analysis was to examine differences in food consumption patterns between WIC participants and nonparticipants.   | FITS                  | 2015 to 2016          | parents/caregivers of children from birth to 4 y living in the 50 states and Washington DC   |

| Author, Year                | Study Name                              | Study Design         | Study Purpose   | Data Source | Data Collection Years   | Eligibility Criteria  |
|-----------------------------|---|----------------------|---|-------------|---|---|
| Hamner, 2019 <sup>32</sup>  | NR                                      | Cross-sectional      | To examine whether enrollment in food assistance programs (e.g. WIC) is associated with improved growth and development outcomes of preterm infants after discharge from the NICU   | NHANES      | 2013 to 2014  | We limited our analyses to children who were 12 to 23 months of age at the time of the physical examination (n = 468). Children were excluded if they did not complete the dietary interview (n = 31), if the dietary intake record was coded as not reliable (n = 12), or if the children were missing information on variables that were required to determine WIC status (n = 7).  |
| Jackson, 2015 <sup>33</sup> | NR                                      | Retrospective cohort | "...I examine how children's early WIC participation is associated in the short-term with cognitive development, and in the longer-term with reading and math achievement. The data sources used here permit me to measure in utero WIC exposure, and to compare children who are exposed to WIC in utero to those who are not. Because many children who receive in utero exposure also participate later in childhood, my results capture the relationship of prenatal and early childhood WIC participation with cognitive development." | NR          | ECLS-B: 2001<br>CDS-PSID: 1968 (this sample 1997) to ECLS-B: 2008<br>CDS-PSID: 2007 | Not described for CDS-PSID data; "In the ECLS-B, I limit analyses to children whose families were eligible for participation during each year. Eligible children are those at or below 185% of the federal poverty threshold during the year leading up to the survey, or those whose mothers participate in other federal assistance programs (SNAP, TANF, and Medicaid) and are automatically eligible to enroll themselves (while pregnant or post-partum) or their children in WIC. " |
| Jun, 2018 <sup>34</sup>     | Feeding Income and Toddler Study (FITS) | Cross-sectional      | The objective of this study was to assess usual nutrient intakes from foods and beverages (not supplements) among US children aged <4 y by WIC participation status.  | FITS        | 2016 to 2016  | Eligibility for FITS participation: parent or caregiver of child <4 years of age, living in United States   |
| Kay, 2021 <sup>35</sup>     | NR                                      | Cross-sectional      | To describe the dietary quality of toddlers, thereby providing guidance that can be used to inform public health nutrition policies, programs, and practices  | FITS        | 2016 to 2016  | NR  |



| Author, Year                   | Study Name | Study Design    | Study Purpose  | Data Source | Data Collection Years | Eligibility Criteria  |
|--------------------------------|------------|-----------------|--|-------------|-----------------------|---|
| Lakshmana n,2020 <sup>36</sup> | NR         | Cross-sectional | To describe associations of enrollment in the WIC and SNAP, and infant growth and neurodevelopmental outcomes among high risk infants (preterm infants)  | Primary     | 2013 to 2015          | English- or Spanish-speaking parents of infants who were up to 24 months corrected age with completed developmental assessments   |
| Li, 2019 <sup>37</sup>         | NR         | Before-after    | To examined the association between participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and breastfeeding outcomes before and after the 2009 revisions. The study applied propensity-score matching to account for selection bias in the WIC participation/breastfeeding relationship. Nationally representative data from the National Health and Nutrition Examination Survey (NHANES) was used to compare WIC effects between children of two different birth cohorts: those born between 2000 and 2008 and those born between 2009 and 2014. Using this approach, the study assessed the association between WIC participation and breastfeeding among the WIC-eligible changed after the 2009 revision while attending to the risk ofselection bias. | NHANES      | 2005 to 2014          | the age range of our analytical sample was from 0 to 59 months old, including 2770 WIC-eligible children born between 2000 and 2008 and 1538 WIC-eligible children born between 2009 and 2014. Based on WIC program rules, we coded only women, infants, and children with a household income below or equal to 185% of the federal poverty line (i.e., income–poverty ratio 1.85) as eligible for WIC. WIC participation was based on the question asking how long a child had received benefits from the WIC program (in months). Children whose participation period was greater than zero were defined as WIC participants. |

| Author, Year                | Study Name | Study Design         | Study Purpose  | Data Source  | Data Collection Years | Eligibility Criteria  |
|-----------------------------|------------|----------------------|--|--|-----------------------|---|
| Litvak, 2020 <sup>38</sup>  | NR         | Cross-sectional      | Assess the diet quality of grocery purchases for households consisting of women of reproductive age and young children and evaluate how participation in SNAP and WIC are related to the diet quality of grocery purchases for these households                    | FoodAPS  | 2012 to 2013          | All households that included a woman of reproductive age (14–49 years), including pregnant women, or a child under the age of five years and with information on grocery purchases  |
| Ng, 2018 <sup>39</sup>      | NR         | Retrospective cohort | Quantify how WIC package revisions relate to PFP among low-income households and if these revisions are associated with differences in the nutrients obtained from packaged food items between WIC and non-WIC households nationally                               | The National Consumer Panel: Homescan data                               | 2008 to 2014          | Households that included at least one child aged 1 to 4 years and were WIC-income-eligible based on household size and inflation-adjusted Federal Poverty Levels  |
| Oh, 2016 <sup>40</sup>      | NR         | Retrospective cohort | Examines purchases of whole grain products before and after the WIC food package revision  | The National Consumer Panel: Homescan data                               | 2008 to 2010          | Nielsen Homescan participants, reported by household  |
| Oropesa, 2001 <sup>41</sup> | NR         | Cross-sectional      | To investigate whether prenatal care and infant health outcomes are associated with family poverty and neighborhood poverty. (WIC is used as a measure of poverty, but WIC/non-WIC comparisons are reported separately for those on public and private insurance). | Birth/death records  | 1994 to 1995          | Mothers of singleton births in Puerto Rico from 1994-1995 whose census tract of residence could be identified from information on the birth certificate and who participated in the survey.   |
| Perkins, 2020 <sup>42</sup> | NR         | Cross-sectional      | To use the Healthy Eating Index HEI to assess the association between participation in EFNEP and dietary behavior change using Maine as a case study.  | Web-Based Nutrition Education Evaluation and Reporting System (WebNEERS) | 2013 to 2016          | Data on adult (age 18 years and older) Maine EFNEP participants from 2013 to 2016. Data were limited to those with complete preprogram and postprogram information. EFNEP participants were excluded if they had missing values that were pertinent to the analysis or if they had an obvious data entry error. |

| Author, Year                | Study Name | Study Design         | Study Purpose   | Data Source         | Data Collection Years | Eligibility Criteria   |
|-----------------------------|------------|----------------------|---|---------------------|-----------------------|--|
| Smock, 2020 <sup>43</sup>   | NR         | Prospective cohort   | To examine patterns of catch-up growth and anemia correction in refugee children younger than 5 years after participation in the Special Supplemental Nutrition for Women, Infants, and Children (WIC) program, and (2) to identify factors associated with recovery from growth abnormalities. | Primary             | 1998 to 2010          | Refugee children younger than 5 years on arrival, who visited a WIC program at least twice between 1998 and 2010.  |
| Soneji, 2019 <sup>15</sup>  | NR         | Retrospective cohort | To assess the association of WIC program participation during pregnancy by low-income expectant mothers covered by Medicaid with infant mortality by gestational age at birth and by maternal race/ethnicity in comparison with their counterparts who did not receive WIC benefits.            | Birth/death records | 2011 to 2017          | Data were from 11 148 261 expectant mothers who delivered live births in states that have implemented the 2003 revision of the US live birth certificate and whose insurance coverage and receipt of WIC benefits were recorded on the birth certificates. |
| Stewart, 2019 <sup>44</sup> | NR         | Cross-sectional      | Assess association between WIC and whole grains is being reduced in size and consistency by several factors.  | FoodAPS             | 2012 to 2013          | WIC households and eligible non-WIC households   |
| Tester, 2016 <sup>45</sup>  | NR         | Before-after         | Examined the impact of the WIC food package revisions on the diet quality of children in households using WIC.  | NHANES              | 2003 to 2012          | Children from households with incomes at or below 185% of the federal poverty level (FPL) in accordance with the Department of Health and Human Services' poverty guideline. Children who were aged 2 to 4 years at the time of the household interview,   |
| Thomas, 2014 <sup>46</sup>  | NR         | Cross-sectional      | "...the aims of this study were to determine (1) 2007-2011 coverage levels [of immunizations] of children based on their WIC status and (2) coverage levels by intervention strategy."  | WIC-LARS, NIS       | 2007 to 2011          | age eligible children in NIS with provider and demographic information   |

| Author, Year                  | Study Name  | Study Design         | Study Purpose   | Data Source  | Data Collection Years | Eligibility Criteria   |
|-------------------------------|---|----------------------|---|--|-----------------------|--|
| Vercammen, 2018 <sup>47</sup> | NR  | Cross-sectional      | The present study aims to provide an updated comparison of total fruit, 100% fruit juice, whole fruit, and total vegetable intake of children 2-4 years of age between income eligible WIC participants versus eligible nonparticipants versus non-income eligible following the 2009 WIC food package revisions. | NHANES   | 2009 to 2014          | From a total of 2,284 eligible children aged 2–4 years from the 2009–2014 National Health and Nutrition Examination Surveys, the study population for this analysis was limited to 1,576 (69.0%) children who had complete data on dietary intake, WIC participation, and all covariates. Participants were excluded if they were missing data on dietary intake data (n=405), overweight/obesity status (n=202), household income (n=183), age at examination (n=113), household education status (n=68), household marital status (n=56), and WIC participation (n=24) or SNAP participation (n=25). |
| Weinfield, 2020 <sup>48</sup> | WIC Infant and Toddlers Feeding Practices Study-2 | Prospective cohort   | To examine the association between breastfeeding duration and later diet quality in a low-income population   | Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Infant and Toddler Feeding Practices Study-2 (ITFPS-2) | 2013 to 2016          | Women who enrolled themselves and/or their infants in the WIC either prenatally or up to 2.5 months postpartum   |
| Weinfield, 2020 <sup>49</sup> | NR  | Retrospective cohort | Examining duration of WIC participation longitudinally over a 2-year period, in relation to diet quality at age 24 months   | WIC Infant and Toddler Feeding Practices Study 2 (WIC ITFPS-2)   | 2013 to 2016          | subset of participants in WIC Infant and Toddler Feeding Practices Study (WIC ITFPS-2), who completed all postnatal interviews up to 24 months; original study inclusion criteria: eligible mothers at least 16 years of age, able to complete in English or Spanish, enrolled in WIC for current pregnancy or for child   |

| Author, Year               | Study Name | Study Design    | Study Purpose   | Data Source | Data Collection Years | Eligibility Criteria  |
|----------------------------|------------|-----------------|---|-------------|-----------------------|---|
| Zimmer, 2020 <sup>50</sup> | NR         | Cross-sectional | To compare mean intake of priority food groups/subgroups of WIC children to WIC-eligible nonparticipants and higher income children. Further, we hoped to assess differences in percent contribution of food subgroups to total food group intake by WIC participation status and income. | NHANES      | 2011 to 2014          | Included information on WIC participation status and were available during the time of analysis. Children with missing/incomplete dietary data (n=89) or with unreliable Day 1 dietary recall status (n=34), and children who consumed breast milk (n=15), were excluded. |

CANDLE= Conditions Affecting Neurocognitive Development and Learning in Early Childhood; CDS-PSID=Child Development Supplement-Panel Study of Income Dynamics; ECLS-B= Early Childhood Longitudinal Study, Birth Cohort; FITS= Feeding Infants and Toddlers Study; Heo A=hepatitis A; MCH=Maternal Child Health; NHANES=National Health and Nutrition Examination Survey; NIS= National Immunization Survey; NR=not reported; NYS WIC= New York State Supplemental Nutrition Program for Women, Infants, and Children; PedNSS=New York Pediatric Nutrition Surveillance System; PRAMS=Pregnancy Risk Assessment Monitoring System; SNAP=Supplemental Nutrition Assistance Program; TN=Tennessee; USDA=United States Department of Agriculture; WIC ITFPS-2= WIC Infant and Toddler Feeding Practices Study; WIC MIS= Supplemental Nutrition Program for Women, Infants, and Children Management Information System; WIC= Supplemental Nutrition Program for Women, Infants, and Children; WIC-LARS= WIC-Linkage Annual Report Survey

**Evidence Table D-4. Study characteristics of studies included in Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                  | Study Name | Study Design  | Study Purpose  | Data Source                  | Data Collection Years | Eligibility Criteria  |
|-------------------------------|------------|---|--|------------------------------|-----------------------|---|
| Anderson, 2020 <sup>51</sup>  | NR         | Secondary data analysis using longitudinal data, Other: Secondary data analysis using longitudinal data | To evaluate whether the reduction in obesity risk associated with the WIC food package change in this population was modified by the food environment around the children's residences.  | Data Mining Project          | 2003 to 2016          | WIC participating children with data in Data Mining Project, who had enrolled in WIC within 42 days of birth through age 4, who had a weight of height measurement each year, and had a census tract of residence   |
| Anderson, 2020 <sup>52</sup>  | NR         | Other: Secondary data analysis using longitudinal data  | Aimed to (1) evaluate how growth patterns from birth to age 4 years and obesity at 4 years of age are related to length of exclusive breastfeeding and (2) whether these relationships were modified by the 2009 WIC package change. | WIC MIS: Data Mining Project | 2003 to 2016          | WIC participating children with data in Data Mining Project, who had enrolled in WIC within 42 days of birth, had complete WIC prescription data for at least 11 of first 13 months of life, and had at least one height and weight per year through age 4 and at age 4   |
| Andreyeva, 2013 <sup>53</sup> | NR         | Prospective cohort  | Assesses how the WIC revisions affected purchases of bread and rice among WIC-participating households in Connecticut and Massachusetts  | Supermarket                  | 2009 to 2010          | All households using supermarket loyalty cards and WIC benefits at any store of the chain during January 2009–June 2011 were selected. Specifically, households with at least one WIC purchase in January 2009 were flagged as WIC and were included, even if they no longer used WIC benefits  |
| Andreyeva, 2013 <sup>54</sup> | NR         | Prospective cohort  | This report describes changes in purchases of 100% juice and other beverages among WIC participants after the WIC revisions.   | Primary                      | 2009 to 2010          | Households were selected if they used WIC benefits during January–September 2009 and January–September 2010, excluding a 3-month transition period after the implementation to avoid misinterpretation of data. <sup>1*</sup> The WIC sample with pre–post data were also restricted to households using WIC benefits regularly (ie, at least once in each of the 3 quarters in 2009 and 2010). |

| <b>Author, Year</b>           | <b>Study Name</b> | <b>Study Design</b>  | <b>Study Purpose</b>  | <b>Data Source</b>  | <b>Data Collection Years</b> | <b>Eligibility Criteria</b>  |
|-------------------------------|-------------------|----------------------|---|---------------------|------------------------------|--|
| Andreyeva, 2014 <sup>55</sup> | NR                | Prospective cohort   | Assesses how the new WIC packages affected milk and cheese purchases and saturated fat intake among WIC households in Connecticut and Massachusetts   | Supermarket         | 2009 to 2010                 | Low-income WIC-participating families who shopped at the grocery chain stores with supermarket loyalty card in Connecticut or Massachusetts in January 2009–June 2011.   |
| Andreyeva, 2015 <sup>56</sup> | NR                | Prospective cohort   | Assesses the potential effects of the new WIC incentives on fruit and vegetable purchases among WIC households in two New England states.   | Supermarket         | 2009 to 2010                 | Low-income WIC-participating families who shopped at the grocery chain stores with supermarket loyalty card in Connecticut or Massachusetts in January 2009–September 2010.  |
| Chaparro, 2019 <sup>57</sup>  | NR                | Retrospective cohort | Evaluate whether the 2009 WIC food package change was associated with changes in growth trajectories from age 0 to 4 y or obesity at age 4 among children who participated in WIC in Los Angeles County between 2003 and 2016 | Data Mining Project | 2003 to 2016                 | Children who participated in WIC in Los Angeles County and received the old food package with children who received the new food package, as well as those who received a full dose of WIC compared with those who received a late dose of WIC. Children who reached age 5 y before 1 October 2009 comprise the old food package group, and children born after 1 October 2009 comprise the new food package group |
| Chaparro, 2019 <sup>58</sup>  | NR                | Retrospective cohort | To assess whether the effect of the 2009 women, infants, and children (WIC) food package change on obesity outcomes varies by initial weight status and gender  | Data Mining Project | 2003 to 2016                 | Children who enrolled in WIC at birth and turned age 5 years (and therefore left the program) before October 1, 2009 were categorized as the old food package exposure group. Children enrolled at birth after October 1, 2009 were categorized as the new food package exposure group   |

| Author, Year                 | Study Name | Study Design   | Study Purpose   | Data Source   | Data Collection Years | Eligibility Criteria   |
|------------------------------|------------|--|---|---|-----------------------|--|
| Chaparro, 2020 <sup>59</sup> | NR         | Other: Secondary data analysis using longitudinal data | to investigate 1) the effect of duration of receipt (dose) of the new child food package; and 2) the effect of the new infant food package on growth trajectories from 0 to 4 years and obesity risk at age 4 among children who participated in WIC in Los Angeles County between 2003 and 2016 and who were fully formula fed as infants. | Data Mining Project   | 2003 to 2016          | WIC participating children with data in Data Mining Project, who had enrolled in WIC within 42 days of birth, received fully formula feeding package every month through first year of life, had at least one weight and height measurement per year and at least one measurement after the age of 4 years |
| Chaparro, 2020 <sup>60</sup> | NR         | Retrospective cohort                                   | Investigate the association between the WIC food package change and growth trajectories and obesity by examining whether the association varies by the type of food package received during infancy, a marker of how much breastfeeding an infant receives.   | Data Mining Project   | 2003 to 2016          | Children participated in WIC in 2003-2016 throughout ages 0 to 4 years (inclusive), enrolled in WIC within 42 days of birth, had at least one weight and height measurement per year and at least one measurement after the age of 4 years.  |
| Chaparro, 2020 <sup>61</sup> | NR         | Before-after   | determine whether a previously reported association between the WIC food package change and reduced child obesity risk among WIC-participating children in Los Angeles County holds across levels of family income and neighborhood poverty.  | Data Mining Project, WIC administrative data from LA County, CA | 2003 to 2016          | Child continuously enrolled in WIC from birth (42 days) until 4 years, with at least one weight and height (or length) for each year, and live in a census tract with at least 5 WIC-participating children  |
| Chiasson, 2016 <sup>62</sup> | NR         | Prospective cohort                                     | Examines breastfeeding and other food consumption patterns in relation to the prevalence of obesity at 3 years of age in a cohort of children enrolled in the NYS WIC Program as infants in 2008–2009   | State surveys   | 2008 to 2013          | All infants enrolled at birth or shortly thereafter in the NYS WIC Program between July 1 and December 31, 2008 and July 1 and December 31, 2009. Infants enrolled during the 6 month implementation period for the revised package were excluded.   |



| <b>Author, Year</b>          | <b>Study Name</b> | <b>Study Design</b>   | <b>Study Purpose</b>  | <b>Data Source</b>                          | <b>Data Collection Years</b> | <b>Eligibility Criteria</b>   |
|------------------------------|-------------------|---|---|---|------------------------------|---|
| Daepp, 2019 <sup>63</sup>    | NR                | Interrupted time series, with repeated cross-sectional measurements | to evaluate association of 2009 changes to WIC food package with child obesity trends   | WIC Participant and Program Characteristics | 2000 to 2014                 | WIC participating 2-4 year olds with data in WIC-PC files from 49 states (excluding Hawaii)   |
| Freedman, 2017 <sup>64</sup> | NR                | Trends  | To describe the prevalence and secular trends of high weight-for-length among abstract infants (ages, 3–23 months) in the biennial US Department of Agriculture Women, Infants, and Children Program and Participants Characteristic (WIC-PC) Survey from 2000 through 2014 | WIC MIS                                     | 2000 to 2014                 | Infants enrolled in WIC who were examined in WIC Participant Characteristics Survey with reported weight, household income, and race/ethnicity data |
| Guthrie, 2020 <sup>65</sup>  | NR                | Cross-sectional   | To investigation associations between WIC participation and nutrients and food groups consumed among children <4 years of age, before and after the 2009 change in WIC food package   | FITS  | 2008 to 2016                 | Child participation in FITS in 2008 or 2016, without missing information regarding child WIC participation  |

| Author, Year                | Study Name | Study Design | Study Purpose   | Data Source | Data Collection Years | Eligibility Criteria  |
|-----------------------------|------------|--------------|---|-------------|-----------------------|---|
| Ishdorj, 2013 <sup>66</sup> | NR         | Before-after | To assess consumptions patterns specific to milk, fruits, vegetables, and grain products among Native American children ages 2-4 years participating in the WIC program. To answer the following questions: What is the differential effect of the removal of whole milk and the reduction in the total amount of milk provided by WIC on milk consumption of children? Does provision of fruits and vegetables and whole grain foods in the revised WIC food packages affect the consumption of these foods and the choices made by children participating in the WIC program? Who are the children most affected by the changes in the program and how are they affected? | NR          | 2009 to 2011          | Participated in a NATFAN questionnaire during the study period (administered at WIC clinics).   |
| Joyce, 2015 <sup>67</sup>   | NR         | Before-after | To analyze changes in breastfeeding among WIC participants from the period before to period after implementation of the new food package  | PRAMS       | 2004 to 2010          | PRAMS: 19 states that have participated in PRAMS continuously from 2004 through 2010; NIS children 19–35 months of age in all 50 states 2004-2010; PedNSS: children in federally funded maternal and child health programs from 16 of the 46 states with data from 2007 through 2011. The PedNSS was discontinued in 2012 |

| Author, Year                   | Study Name | Study Design | Study Purpose   | Data Source   | Data Collection Years             | Eligibility Criteria   |
|--------------------------------|------------|--------------|---|---------------|-----------------------------------|--|
| Kong, 2014 <sup>19</sup>       | NR         | Before-after | To examine the longer-term impact of the 2009 WIC food package change on nutrient and food group intake and overall diet quality among African American and Hispanic WIC child participants and their mothers/caregivers. | Primary       | summer 2009 to winter/spring 2011 | Parent-child dyads were eligible for the longitudinal study if the child was aged between 2 and 3.5 years at baseline and participating in WIC. This age range was chosen to ensure that the child would be eating solid foods and would still be eligible for WIC (<5 years old) at the 18-month visit. Parents or guardians with a child enrolled in WIC were eligible if they were fluent in either English or Spanish.   |
| Langellier, 2014 <sup>68</sup> | NR         | Before-after | To assess the effect of the 2009 Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food package on breastfeeding outcomes among WIC participants in Los Angeles County, California            | State surveys | 2005 to 2011                      | All participants receiving WIC services in Los Angeles County during January of the survey year (2005, 2008, 2011); surveys completed in English or Spanish only and reported that they or a child in the household was enrolled in the WIC program were eligible for the survey. If participants reported that more than 1 child in the household was enrolled in the WIC program, data were collected regarding only the child with the most recent birthday. Because the new food package was implemented on October 1, 2009, analyses for the 2011 survey was restricted to the subsample of mothers whose children were born on or after that date. To ensure that age distribution was consistent across survey years, we also restricted our analyses to participants in the 2008 sample who were born after October 1, 2006, and those in the 2005 sample who were born after October 1, 2003. |

| <b>Author, Year</b>         | <b>Study Name</b> | <b>Study Design</b> | <b>Study Purpose</b>  | <b>Data Source</b> | <b>Data Collection Years</b>   | <b>Eligibility Criteria</b>   |
|-----------------------------|-------------------|---------------------|---|--------------------|--|---|
| Lee, 2017 <sup>69</sup>     | NR                | Prospective cohort  | To assess breastfeeding trends among New York WIC infants, indicators for measuring breastfeeding practices reported by the New York Pediatric Nutrition Surveillance System (PedNSS) during 2002–2015 were examined. | WIC MIS, PedNSS    | 2002 to 2015   | Infants born during the reporting period and who have valid breastfeeding information are included in the breastfeeding initiation analysis. For each category of breastfeeding duration and exclusivity, analyses include only infants who attained the age of interest during the reporting period by their date of visit. During 2002–2015 |
| Meiqari, 2015 <sup>70</sup> | NR                | Before-after        | To examine if the mothers and their eldest child participating in WIC would accept the 2009 new Women, Infants, and Children (WIC) program package and drink more low-fat milk.                                       | Primary            | shortly before Oct. 2009 to four weeks after the implementation of the WIC policy change (around the end of Oct. 2009) | Eligible mothers were those who received new WIC vouchers at the visit, were 18 years of age or older, were not pregnant, had a child between 12 months and five years old receiving WIC services, and spoke English as the primary language at home. Mothers did not need to receive WIC services for themselves in order to participate.    |

| Author, Year                    | Study Name                 | Study Design                                     | Study Purpose  | Data Source                | Data Collection Years               | Eligibility Criteria  |
|---------------------------------|----------------------------|--|--|----------------------------|-------------------------------------|---|
| Morshed, 2015 <sup>71</sup>     | NR                         | Cross-sectional                                  | "This study explores whether policy changes in the WIC food package resulted in changes in fruit, vegetable, whole grain, fruit juice, type of milk, and saturated fat intake among preschool children from WIC-participating households in rural New Mexico communities." | Primary                    | Fall 2008 to Spring 2010            | "For the present study, participants were included if they, or someone in their household, received WIC benefits. For data collected before the implementation of WIC food package changes, before October 1, 2009, participants were asked if they or someone in their household received WIC benefits anytime during the past 3 years, and they were included if they answered "yes." For data collected after the WIC food package changes, in spring 2010, participants were asked if they or someone in their household received WIC benefits in the last 6 months, that is since October 2009, and they were included if they answered "yes." These questions aimed to identify WIC-eligible families before and after the policy change, regardless of duration on WIC." |
| Odoms-Young, 2014 <sup>72</sup> | Chicago Family Food Survey | Before-after; Subsequent cross-sectional studies | To assess the impact of the 2009 food packages mandated by the WIC program on dietary intake and home food availability in low-income African American and Hispanic parent/child dyads.  | Primary                    | Summer, 2009 to Winter/Spring, 2010 | Parent-child dyads were eligible for the original cross-sectional study if the child was enrolled in WIC, if the child was between 2 and 3.5 years old, and if the parent/guardian was fluent in English or Spanish.  |
| Odoms-Young, 2014 <sup>72</sup> | Chicago Family Food Survey | Before-after                                     | To assess the impact of the 2009 food packages mandated by the WIC program on dietary intake and home food availability in low-income African American and Hispanic parent/child dyads.  | Chicago Family Food Survey | Summer, 2009 to Winter/Spring, 2010 | Parent-child dyads were eligible for the original cross-sectional study if the child was enrolled in WIC, if the child was between 2 and 3.5 years old, and if the parent/guardian was fluent in English or Spanish.  |
| Pan, 2016 <sup>73, 74</sup>     | NR                         | Retrospective cohort                             | Examines trends in overweight and obesity by age, sex, and race/ethnicity using WIC data from 2010 to 2016   | WIC MIS                    | 2000 to 2016                        | Children aged 2 through 4 years from 50 states, the District of Columbia, and 5 US territories enrolled in WIC in 2000 through 2016 were included in this study   |

| Author, Year                 | Study Name                                 | Study Design | Study Purpose  | Data Source | Data Collection Years           | Eligibility Criteria   |
|------------------------------|--|--------------|--|-------------|---------------------------------|--|
| Pan, 2021 <sup>75</sup>      | Parent study: Freedman, 2017 <sup>64</sup> | Trends       | To examine whether declines in high weight-for-length observed between 2010 and 2014 continued through 2018  | WIC MIS     | 2010 to 2018                    | Infants enrolled in WIC who were examined in WIC Participant Characteristics Survey with reported weight, household income, and race/ethnicity data  |
| Thornton, 2014 <sup>76</sup> | NR   | Before-after | "The purpose of this study was to investigate usual nutrient intakes within a rural, majority Hispanic population of WIC infants and toddlers in central Texas (CTX-WIC) after the WIC package changes. The specific study objectives were to (1) determine whether there were differences in intakes of IOM-identified priority nutrients before and after the package changes; and (2) compare nutrient intakes within the CTX-WIC population with national intake recommendations." | Primary     | June-Sept 2009 to July-Nov 2011 | caregivers of infants and toddlers ages 4-24 months (sampled from WIC participants); 1 child per household; in the 2011 sample, children born before Oct. 2009 were excluded   |
| Whaley, 2012 <sup>77</sup>   | NR   | Before-after | The objective of this study was to assess whether the key goals of the changes in the breastfeeding policies and food packages—to increase the issuance of the infant food package that does not include formula and decrease the issuance of the infant food packages that include formula—were achieved among a large population of WIC participants in California.  | WIC MIS     | 2007 to 2010                    | observations of the approximately 5000 infants born each month, examining rates of issuance of the fully breastfeeding package to newborns, 2-month-old infants, and 6-month-old infants each month. These observations over the 3 years from 2007 to 2010 are not repeated observations of the same 5000 children, but each month we captured all enrolled newborns, 2-month-old infants, and 6-months-old infants issued a food package. |

| Author, Year               | Study Name | Study Design         | Study Purpose  | Data Source   | Data Collection Years   | Eligibility Criteria   |
|----------------------------|------------|----------------------|--|---------------|---|--|
| Whaley, 2012 <sup>21</sup> | NR         | Before-after         | Explore the impact of the new WIC food package on WIC participant consumption of fruit, vegetables, wholegrain food, and lower-fat milk  | State surveys | 2009 to 2010  | California WIC participants who received WIC services (N > 800,000) in July, 2009 (prior to the food package change) and in January, 2010 (after the food package change). Respondents were either pregnant or postpartum women, or the parent of a child (0-5 years old) enrolled in WIC. |
| Wilde, 2012 <sup>78</sup>  | NR         | Before-after         | The purpose of this study was to measure changes in the following 3 outcomes: WIC food-package assignments, WIC infant formula amounts, and breastfeeding initiation.  | WIC MIS       | 2009 (three months before implementation of new food package) to 2010 (eight months after implementation of new food package) | mother-infant dyads with infants aged 0–5 mo before and after implementation of the interim rule from 17 LWAs in 10 states (California, Florida, Georgia, Idaho, Illinois, Minnesota, Rhode Island, Tennessee, Texas, and Utah)  |
| Zimmer, 2019 <sup>79</sup> | NR         | Retrospective cohort | To evaluate changes in dietary intake of WIC children and women before v. after implementation of the 2009 food package revisions, with a focus on priority nutrients and food groups identified by the NASEM for future package changes | NHANES        | 2005 to 2014  | Adult females aged 19–50 years living in households receiving WIC benefits at the time of NHANES interview. Children living in households receiving WIC benefits at the time of NHANES interview. Analyses are for children ages from 2nd up to 5th birthday.                              |

CANDLE= Conditions Affecting Neurocognitive Development and Learning in Early Childhood; CDS-PSID=Child Development Supplement-Panel Study of Income Dynamics; ECLS-B= Early Childhood Longitudinal Study, Birth Cohort; FITS= Feeding Infants and Toddlers Study; Heo A=hepatitis A; MCH=Maternal Child Health; NHANES=National Health and Nutrition Examination Survey; NIS= National Immunization Survey; NR=not reported; NYS WIC= New York State Supplemental Nutrition Program for Women, Infants, and Children; PedNSS=New York Pediatric Nutrition Surveillance System; PRAMS=Pregnancy Risk Assessment Monitoring System; SNAP=Supplemental Nutrition Assistance Program; TN=Tennessee; USDA=United States Department of Agriculture; WIC ITFPS-2= WIC Infant and Toddler Feeding Practices Study; WIC MIS= Supplemental Nutrition Program for Women, Infants, and Children Management Information System; WIC= Supplemental Nutrition Program for Women, Infants, and Children; WIC-LARS= WIC-Linkage Annual Report Survey

**Evidence Table D-5. Characteristics of the WIC Program Components covered in the studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | WIC Exposure   | Exposure Definition  | Exposure Duration | WIC Program Components | WIC Setting  | Intervention  | Comparison/Contrast   |
|---------------------------|----------------|--|-------------------|------------------------|--|---|---|
| Angley, 2018 <sup>1</sup> | Pregnant women | Participated in WIC during pregnancy                                   | NR                | Not specify            | Local WIC agency: Bristol County, Massachusetts and the state of Rhode Island; DeKalb County, Georgia; Galveston and Brazoria Counties, Texas; Bexar County, Texas and Salt Lake County, Utah, Bristol County, Massachusetts and the state of Rhode Island; DeKalb County, Georgia; Galveston and Brazoria Counties, Texas; Bexar County, Texas and Salt Lake County, Utah | Stillbirths   | Live births vs stillbirths in race subgroups by WIC participation     |
| Baer, 2019 <sup>2</sup>   | Pregnant women | Participation in the WIC program recorded on birth certificate records | NR                | Not specify            | State: California  | WIC participation during pregnancy among publicly insured mothers | WIC non-participation during pregnancy among publicly insured mothers |



| Author, Year                     | WIC Exposure                                     | Exposure Definition   | Exposure Duration   | WIC Program Components | WIC Setting             | Intervention                    | Comparison/Contrast  |
|----------------------------------|--|---|---|------------------------|-------------------------|---------------------------------|--|
| Bersak, 2021 <sup>3</sup>        | Pregnant women                                   | Did you receive WIC food for yourself because you were pregnant with this child? Yes  | NR  | Not specify            | State: South Carolina   | WIC enrollment during pregnancy | Medicaid eligible mothers who are not enrolled in WIC during pregnancy   |
| Bolbocean, 2021 <sup>4</sup>     | Pregnant women; Children, ages 1 through 2 years | For the Child Development outcomes, the main exposure that is specified is "WIC up to year 1 only versus WIC Up through year 2). For the dietary outcomes (pregnant women): WIC participating women vs not participating in WIC | Each child can be categorized into one of the following four categories: (a) the child participated in both years, (b) the child did not participate in either year, (c) the child participated in year 1 but not year 2, or (d) the child participated in year 2 but not year 1. We call "switchers" children in categories (c) and (d), and "non-switchers" children in categories (a) and (b). | NR                     | Other: One county in TN | Not applicable                  | Child development outcomes examine differences between children receiving WIC at age 1 and not at 2 versus those receiving WIC age 1 through 2 ; Pregnancy dietary outcomes examine among mothers receiving WIC versus those who do not during pregnancy |
| El-Bastawissi, 2007 <sup>5</sup> | Pregnant women                                   | Selected from the WIC CIMS database   | NA  | Not specify            | State: Washington       | Prenatal participation in WIC   | Eligible for WIC (defined by Medicaid or TANF participation) but did not participate in WIC during pregnancy   |

| Author, Year               | WIC Exposure               | Exposure Definition   | Exposure Duration   | WIC Program Components | WIC Setting                 | Intervention                               | Comparison/Contrast   |
|----------------------------|----------------------------|---|---|------------------------|-----------------------------|--|---|
| Fingar, 2017 <sup>6</sup>  | Postpartum                 | "Any WIC enrollment"  | During pregnancy and up to 46 weeks after last menstrual period | Food package           | State: California           | Redeemed WIC food package during pregnancy | Redeemed WIC food package during pregnancy vs Did not redeem WIC food package |
| Gleason, 2020 <sup>7</sup> | Pregnant women             | Enrolled in WIC for the first time during pregnancy or before their infant was 2.5 months old                   | NR  | Breastfeeding support  | National                    | NA   | NR  |
| Hamad, 2019 <sup>8</sup>   | Pregnant women, Postpartum | Women received the revised package during pregnancy   | NR  | Food package           | Local WIC agency: Tennessee | Post-revision                              | Pre-revision vs post revision   |
| Kasim, 2021 <sup>9</sup>   | Pregnant women             | WIC is a binary variable that measures whether a mother reported receiving WIC during her most recent pregnancy | NR  | Not specify            | National                    | NA   | WIC recipient vs WIC eligible non WIC recipients                              |
| Ma, 2014 <sup>10</sup>     | Pregnant women             | WIC participation was assessed by the question "during your most recent pregnancy, were you one WIC?"           | NR  | Not specify            | State: South Carolina       | WIC participation during pregnancy         | Income-eligible, but did not participate in WIC during pregnancy              |

| Author, Year                | WIC Exposure  | Exposure Definition  | Exposure Duration | WIC Program Components | WIC Setting           | Intervention  | Comparison/Contrast  |
|-----------------------------|---|--|-------------------|------------------------|-----------------------|---|--|
| McCoy, 2018 <sup>11</sup>   | Study A: Pregnant women<br>Study B: Pregnant and/or post-partum women | Study A: Those who received peer services during pregnancy<br>Study B: Those who received peer services either during pregnancy or during the post-partum period | NA                | Breastfeeding support  | State: Minnesota      | Study A: For breastfeeding initiation: One or more prenatal contacts between the client and a PC program staff member<br>Study B: For breastfeeding continuation: One or more contacts with a PC program staff member regardless of whether the first contact was prenatal or post-partum | Study A: For breastfeeding initiation: No prenatal contacts with a PC program staff member (i.e., no contact ever/not assigned a peer or first contact is post-partum)<br>Study B: For breastfeeding continuation: No contact with a PC program staff member during the prenatal or post-partum period (i.e., no contact or not assigned a peer) |
| Rhee, 2019 <sup>12</sup>    | Postpartum  | Participation in WIC during pregnancy  | NR                | Not specify            | State: Massachusetts  | Participation in WIC during pregnancy.  | WIC vs non-WIC participation   |
| Sonchak, 2016 <sup>13</sup> | Pregnant women  | Maternal WIC participation, obtained from a mother as a response to a check box item on a maternal worksheet   | NR                | Not specify            | State: South Carolina | WIC participation obtained from a mother as a response to a check box item on a maternal worksheet  | WIC non-participation, but eligible (because analyses restricted to mothers on Medicaid for all pregnancies)   |
| Sonchak, 2017 <sup>14</sup> | Postpartum  | Enrolled in WIC  | NR                | Breastfeeding support  | State: South Carolina | WIC participation   | WIC vs non-WIC participation   |

| <b>Author, Year</b>        | <b>WIC Exposure</b> | <b>Exposure Definition</b>   | <b>Exposure Duration</b> | <b>WIC Program Components</b> | <b>WIC Setting</b>  | <b>Intervention</b>   | <b>Comparison/Contrast</b>  |
|----------------------------|---------------------|--|--------------------------|-------------------------------|---|---|---|
| Soneji, 2019 <sup>15</sup> | Pregnant women      | Receipt of WIC benefits during pregnancy recorded on birth certificate | NR                       | Not specify                   | National  | WIC participation during pregnancy among Medicaid-insured expectant mothers | WIC non-participation during pregnancy among Medicaid-insured expectant mothers |
| Testa, 2020 <sup>16</sup>  | Postpartum          | WIC+Medicaid vs. No WIC +Medicaid                                      | NR                       | Not specify                   | State: Forty-seven states, Puerto Rico, and the District of Columbia (No data from California, Idaho, and Ohio) | NA  | NR  |
| Zhang, 2021 <sup>17</sup>  | Child (1-2)         | Has the child ever received WIC benefits                               | NR                       | Not specify                   | National  | WIC participation at infancy  | WIC-eligible non-participating children   |

EFNEP=Expanded Food and Nutrition Education Program; NA=not available; NR=not report; PC=peer counseling; WIC CIMS= Supplemental Nutrition Program for Women, Infants, and Children Client Information Management System; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-6. Characteristics of the WIC Program Components covered in the studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | WIC Exposure  | Exposure Definition   | Exposure Duration                                   | WIC Program Components | WIC Setting                               | Intervention           | Comparison/Contrast   |
|----------------------------|---|---|---|------------------------|---|------------------------|---|
| Hamad, 2019 <sup>18</sup>  | Pregnant women  | A woman to have received the revised WIC food package if her pregnancy occurred after the October 2009 revisions. Women whose pregnancies included October 2009 were classified as having received the revised package if they gave birth in February 2010 or later | NR  | Food package           | State: California                         | Post-revision WIC      | Received WIC before revision vs Received after WIC revision |
| Kong, 2014 <sup>19</sup>   | Child(2-5)  | enrolled in WIC at baseline and at follow-up  | 18 months   | Not specify            | State, Local WIC agency: Illinois Chicago | Policy change          | Pre to post 2009 food package change                        |
| Oberle, 2020 <sup>20</sup> | Pregnant women, Postpartum  | Self report of current receipt of WIC benefits  | NR  | Not specify            | National                                  | Post-2009 WIC revision | pre/post policy change                                      |
| Whaley, 2012 <sup>21</sup> | Pregnant women, Postpartum, Caregivers/guardians of children participating in WIC | Participation in California WIC   | Received services in July 2009 through January 2010 | Food package           | State: California                         | Post-2009 WIC revision | Pre vs Post-WIC revision                                    |

EFNEP=Expanded Food and Nutrition Education Program; NA=not available; NR=not report; PC=peer counseling; WIC CIMS= Supplemental Nutrition Program for Women, Infants, and Children Client Information Management System; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-7. Characteristics of the WIC Program Components covered in the studies investigating the Key Question 2 association between dietary and health outcomes and infant and WIC participation compared with eligible non-participants**

| Author, Year                  | WIC Exposure             | Definition of "Exposure to WIC"  | Duration of Exposure  | WIC Program Key Components | WIC Setting  | Intervention                               | Comparison/contrast  |
|-------------------------------|--------------------------|--|---|----------------------------|--|--|--|
| Andreyeva, 2016 <sup>22</sup> | Family/household         | Households that used WIC benefits when shopping  | NR  | Food package               | State: Connecticut and Massachusetts   | WIC food package intervention              | Pre-WIC revision vs Post-WIC revision, for WIC household and comparison household (former WIC households, but no longer participating) groups  |
| Arons, 2016 <sup>23</sup>     | Infant(0-1), Child (1-2) | self report in study specific questionnaire  | Considered various time-varying exposures including enrolled at both 12 and 24 months | Not specify                | Other: NR; in Shelby County Tennessee  | no intervention                            | Amongst Medicaid recipients (all of whom are WIC eligible), they compare WIC participants non-WIC participants   |
| Barrera, 2018 <sup>24</sup>   | Children 6-36 months     | Report of receipt within past 12 months  | NR  | Not specify                | National   | WIC participation is covariate in analyses | WIC participation is a covariate in analysis examining complementary feeding initiation  |
| Bersak, 2018 <sup>25</sup>    | Pregnant women           | maternal WIC participation during pregnancy from a maternal worksheet within a few days after delivery.                | NR  | Not specify                | State: South Carolina  | Women participating in WIC                 | Women in the South Carolina Medicaid Database participating in WIC during pregnancy (WIC) vs WIC eligible women not participating in WIC during pregnancy (Non-WIC)  |
| Black, 2012 <sup>26</sup>     | Infant(0-1), Child (1-2) | Described as eligible children < 36 months of age; question was whether the child was currently receiving WIC services | NR  | Not specify                | Other: Participants identified from urban medical centers in Baltimore, Boston, Little Rock, Los Angeles, Minneapolis, Philadelphia, and Washington DC | WIC participation                          | Groups were defined by number of stressors (none, 1, or 2) and stressors were household food insecurity and caregiver depressive symptoms; sub-analysis was conducted to see whether WIC participation attenuates the relationship |

| Author, Year                 | WIC Exposure                                     | Definition of "Exposure to WIC"   | Duration of Exposure  | WIC Program Key Components | WIC Setting              | Intervention   | Comparison/contrast  |
|------------------------------|--|---|---|----------------------------|--------------------------|--|--|
| Bolbocean, 2021 <sup>4</sup> | Pregnant women; Children, ages 1 through 2 years | For the Child Development outcomes, the main exposure that is specified is "WIC up to year 1 only versus WIC Up through year 2). For the dietary outcomes (pregnant women): WIC participating women vs not participating in WIC | Each child can be categorized into one of the following four categories: (a) the child participated in both years, (b) the child did not participate in either year, (c) the child participated in year 1 but not year 2, or (d) the child participated in year 2 but not year 1. We call "switchers" children in categories (c) and (d), and "non-switchers" children in categories (a) and (b). | Not specify                | Other: Shelby County, TN | Not applicable   | Child development outcomes examine differences between children receiving WIC at age 1 and not at 2 versus those receiving WIC age 1 through 2 ; Pregnancy dietary outcomes examine among mothers receiving WIC versus those who do not during pregnancy |
| Casillas, 2017 <sup>27</sup> | Children 19-35 months                            | Ever received WIC in the past   | NR  | Not specify                | National                 | NR   | WIC participation is covariate in analysis exploring Hepatitis A vaccination receipt   |
| Fang, 2019 <sup>28</sup>     | Family/household                                 | Used WIC benefits on one or more purchase occasions during the interview period   | NR  | Food package               | National                 | Redeemed WIC   | Redeemed WIC vs Did not redeem WIC   |
| Gu, 2017 <sup>29</sup>       | Child(2-5)                                       | self-reported receipt of WIC in the past 12 months  | NR  | Not specify                | National                 | Received WIC in the past 12 months of the survey and had a poverty-income (PIR) ratio of $\leq 1.85$ | Did not receive WIC in the past 12 months of the survey and had a PIR $\leq 1.85$  |

| <b>Author, Year</b>         | <b>WIC Exposure</b>                   | <b>Definition of "Exposure to WIC"</b>   | <b>Duration of Exposure</b> | <b>WIC Program Key Components</b> | <b>WIC Setting</b> | <b>Intervention</b>  | <b>Comparison/contrast</b>   |
|-----------------------------|---------------------------------------|--|-----------------------------|-----------------------------------|--------------------|--|--|
| Gu, 2017 <sup>29</sup>      | Child(2-5)                            | self-reported receipt of WIC in the past 12 months                                 | NR                          | Not specify                       | National           | Received WIC in the past 12 months of the survey and had a poverty-income (PIR) ratio of $\leq 1.85$   | Did not receive WIC in the past 12 months of the survey and had a PIR $\leq 1.85$  |
| Guan, 2021 <sup>30</sup>    | Pregnant women                        | Self-reported retrospectively during post-partum survey waves                      | NR                          | Not specify                       | State: Tennessee   | Exposure to the revised package (i.e., women who delivered after October 2009 were considered to be exposed, regardless of the duration of their exposure) | Not exposed to package revision (delivered before the revision was implemented in October 2009)  |
| Guthrie, 2018 <sup>31</sup> | child (0-1), child (1-2), child (2-5) | reported child WIC participation   | NR                          | Not specify                       | National           | WIC Participants (based on child enrollment)   | Non-WIC participant (lower income); Non-WIC participant (higher income)  |
| Hamner, 2019 <sup>32</sup>  | Child (1-2)                           | WIC status was defined as currently receiving WIC benefits.                        | NR                          | Not specify                       | National           | Currently receiving WIC  | 1) Children eligible but not receiving WIC (defined as children who did not report currently receiving WIC and whose family income/poverty ratio was $\leq 1.85$ or received Medicaid or SNAP benefits, (2) Children not income eligible (as described in # 1) to received WIC |
| Jackson, 2015 <sup>33</sup> | Pregnant women                        | Exposure is "exposed to WIC very early in life" and question asked is prenatal WIC | NR                          | Not specify                       | National           | NA   | WIC exposure in utero vs. WIC eligible   |



| <b>Author, Year</b>            | <b>WIC Exposure</b>                   | <b>Definition of "Exposure to WIC"</b>  | <b>Duration of Exposure</b> | <b>WIC Program Key Components</b> | <b>WIC Setting</b>  | <b>Intervention</b>                     | <b>Comparison/contrast</b>   |
|--------------------------------|---------------------------------------|---|-----------------------------|-----------------------------------|---|---|--|
| Jun, 2018 <sup>34</sup>        | Children 0 to <4 years                | "is the child currently receiving benefits from WIC?"Not clearly reported in manuscript; reviewed FITS study- appears self-reported participation of child and/or mother  | NR                          | Not specify                       | National  | WIC participation                       | WIC vs Non-WIC participation   |
| Kay, 2021 <sup>35</sup>        | infants, toddlers                     | WIC participation   | NR                          | Not specify                       | National  | NA                                      | P-value reporting significant difference across the group (3 arms, WIC, WIC-Eligible, Non-WIC)             |
| Lakshmanan, 2020 <sup>36</sup> | preterm infant <37 mo old             | caregiver self-report enrollment in WIC   | NR                          | Not specify                       | Other: quaternary urban hospital,<br>Other: Quaternary urban hospital | caregiver self-report enrollment in WIC | Eligible but not enrolled in WIC or WIC and SNAP   |
| Li, 2019 <sup>37</sup>         | 0-59 months; infants and children 2-5 | WIC participation was based on the question asking how long a child had received benefits from the WIC program (in months). Children whose participation period was greater than zero were defined as WIC participants. | NR                          | Food package                      | National  | Pre-revision WIC                        | Pre-revision vs Post-revision  |
| Litvak, 2020 <sup>38</sup>     | Family/household                      | Not defined   | NR                          | Not specify                       | National  | WIC household                           | SNAP household, income eligible for WIC household, income ineligible for WIC household, WIC+SNAP household |

| <b>Author, Year</b>         | <b>WIC Exposure</b>                   | <b>Definition of “Exposure to WIC”</b>   | <b>Duration of Exposure</b> | <b>WIC Program Key Components</b> | <b>WIC Setting</b>                        | <b>Intervention</b>   | <b>Comparison/contrast</b>   |
|-----------------------------|---------------------------------------|--|-----------------------------|-----------------------------------|---|---|--|
| Ng, 2018 <sup>39</sup>      | Family/household                      | Self declared WIC participation of female head of household                                      | NR                          | Food package                      | National                                  | WIC participation   | WIC vs non-WIC participation   |
| Oh, 2016 <sup>40</sup>      | Family/household                      | Self declared WIC participation  | NR                          | Food package                      | National                                  | WIC participation   | WIC vs non-WIC participation   |
| Oropesa, 2001 <sup>41</sup> | Pregnant women                        | Participated in WIC  | NA                          | Not specify                       | WIC agencies -US territories: Puerto Rico | Participated in WIC and used public insurance to pay for medical care during pregnancy          | Did not participate in WIC, but were eligible (as indicated by use of public insurance to pay for medical care during pregnancy)   |
| Perkins, 2020 <sup>42</sup> | Main EFNP participants                | Enrolled in the EFNEP  | NR                          | Not specify                       | State: Maine                              | NA  | NR   |
| Smock, 2020 <sup>43</sup>   | child (0-1), child (1-2), child (2-5) | children who visited a WIC program at least twice between 1998 and 2010.                         | NR                          | Not specify                       | State: Massachusetts WIC                  | 5+ WIC visits   | 2-4 WIC visits   |
| Soneji, 2019 <sup>15</sup>  | Pregnant women                        | Receipt of WIC benefits during pregnancy recorded on birth certificate                           | NR                          | Not specify                       | National                                  | WIC participation during pregnancy among Medicaid-insured expectant mothers                     | WIC non-participation during pregnancy among Medicaid-insured expectant mothers  |
| Stewart, 2019 <sup>44</sup> | Family/household                      | Self-identified as participating in WIC or reporting using WIC benefits during the survey period | NR                          | Not specify                       | National                                  | Self-identified as participating in WIC or reported using WIC benefits during the survey period | Did not report participating in WIC and did not use WIC benefits during the survey period, but were income eligible (income <185% of poverty thresholds) and categorically eligible (include a female who is pregnant or postpartum and/or children aged less than 5 years old). |

| <b>Author, Year</b>        | <b>WIC Exposure</b>                  | <b>Definition of "Exposure to WIC"</b>  | <b>Duration of Exposure</b> | <b>WIC Program Key Components</b> | <b>WIC Setting</b> | <b>Intervention</b>  | <b>Comparison/contrast</b>  |
|----------------------------|--------------------------------------|---|-----------------------------|-----------------------------------|--------------------|--|---|
| Tester, 2016 <sup>45</sup> | Child(2-5)                           | Household WIC participation determined by question "In the last 12 months, did you [the child] or any member of the household receive benefits from the WIC program, that is, the Women, Infants and Children program?" | NR                          | Food package                      | National           | WIC participants (stratified by before and after package revision)   | Non-WIC vs WIC participants (stratified by before and after package revision)   |
| Thomas, 2014 <sup>46</sup> | Child(2-5), Child (1-2), Infant(0-1) | WIC-Linkage Annual Report Survey data (details not provided)  | NR                          | Not specify                       | National           | categories of immunization encouragement ((1) assessment and referral [A&R] or (2) A&R plus supplemental strategies), Categories of immunization encouragement ((1) assessment and referral [A&R] or (2) A&R plus supplemental strategies) | Comparing immunization coverage of current WIC participants to: previous WIC participants/income-eligible non-participants/non-eligible non-participants; Comparing immunization coverage of previous WIC participants to: current WIC participants/income-eligible non-participants/non-eligible non-participants; Comparing immunization coverage of WIC-eligible never participants to: current WIC participants/income-eligible previous participants/non-eligible non-participants |

| Author, Year                  | WIC Exposure | Definition of "Exposure to WIC"   | Duration of Exposure   | WIC Program Key Components | WIC Setting | Intervention        | Comparison/contrast  |
|-------------------------------|--------------|---|--|----------------------------|-------------|---------------------|--|
| Vercammen, 2018 <sup>47</sup> | Child(2-5)   | children were considered WIC Participants if their household reported receiving WIC benefits in the past 12 months. Children were considered nonparticipants if their household did not report WIC participation, with income-eligible nonparticipants reporting income $\leq 185\%$ of the FPL and higher-income nonparticipants reporting income $>185\%$ of the FPL. | NR   | Food package               | National    | Participated in WIC | WIC participants (household reported receiving WIC benefits in the past 12 months); Income-eligible nonparticipants (household did not report WIC participation and income $\leq 185\%$ FPL); Higher-income nonparticipants (income $>185\%$ FPL \ |
| Weinfield, 2020 <sup>48</sup> | Dyads        | WIC Participant<br>Duration based on number of study interviews between 3 and 24 months during which the participant reported receiving WIC benefits for herself or the study child   | Low (on WIC for four or fewer interviews)<br>Intermediate (on WIC for 5-7 interviews); High (on WIC for 8 to 9 interviews) | Not specify                | National    | No intervention     | Comparison between low, intermediate, and high WIC duration  |

| Author, Year                  | WIC Exposure | Definition of "Exposure to WIC"                     | Duration of Exposure  | WIC Program Key Components | WIC Setting | Intervention  | Comparison/contrast   |
|-------------------------------|--------------|---|---|----------------------------|-------------|---|---|
| Weinfield, 2020 <sup>49</sup> | Dyads        | Self-reported WIC participation of child and mother | Low duration: Reported receipt at less than 4 or few study interviews and not beyond 13 months; Intermediate: reported receipt at 5-7 interviews or between 15-24 months; high: receiving benefits 8 or 9 interviews, participation through most of 2 years | Not specify                | National    | Low duration: Reported receipt at less than 4 or few study interviews and not beyond 13 months; Intermediate: reported receipt at 5-7 interviews or between 15-24 months; high: receiving benefits 8 or 9 interviews, participation through most of 2 years | By duration of WIC enrollment   |
| Zimmer, 2020 <sup>50</sup>    | Child(2-5)   | "WIC participation status"                          | NR  | Food package               | National    | WIC participating children  | High income WIC ineligible children vs WIC eligible nonparticipating children vs WIC participating children |

A&R=assessment and referral; AL=Alabama; AR=Arkansas; CO=Colorado; FPL=federal poverty level; GA=Georgia; HI=Hawaii; ITO=Indian Tribal Organization; KS=Kansas; KY=Kentucky; MD=Maryland; ME=Maine; MI=Michigan; MN=Minnesota; MS=Mississippi; MT=Montana; NE=Nebraska; NJ=New Jersey; NR=not reported; NY=New York; OH=Ohio; OK=Oklahoma; OR=Oregon; PA=Pennsylvania; PedNSS=New York Pediatric Nutrition Surveillance System; PIR=poverty income ratio; PRAMS=Pregnancy Risk Assessment Monitoring System; RI=Rhode Island; SC=South Carolina; TN=Tennessee; TX=Texas; UT=Utah; VT=Vermont; WA=Washington; WI=Wisconsin; WIC=Supplemental Nutrition Program for Women, Infants, and Children; WV=West Virginia

**Evidence Table D-8. Characteristics of the WIC program components covered in the studies investigating the Key Question 2 association of the 2009 food package change with dietary and health outcomes in childhood**

| Author, Year                  | WIC Exposure       | Definition of "Exposure to WIC"   | Duration of Exposure | WIC Program Key Components | WIC Setting                                      | Intervention                  | Comparison/contrast   |
|-------------------------------|--------------------|---|----------------------|----------------------------|--|-------------------------------|---|
| Anderson, 2020 <sup>51</sup>  | Ages 0 to 4 years  | WIC new food package exposure as a pre-post measure   | NR                   | Food package               | Local WIC agency: Los Angeles County, California | NR                            | Old vs new food package   |
| Anderson, 2020 <sup>52</sup>  | Children 0-4 years | WIC new food package (fully breastfeeding package) exposure as a pre-post measure   | NR                   | Food package               | Local WIC agency: California: Los Angeles County | WIC exposure                  | Examined how association between outcomes (WHZ trajectory and obesity at age 4) and exposure (number of months receiving fully breastfeeding package as proxy for exclusive breastfeeding) and modification by exposure to WIC package (pre vs post 2009) |
| Andreyeva, 2013 <sup>53</sup> | Family/household   | Households that used WIC benefits in January 2009 were flagged as WIC and followed forward even if they no longer used WIC and might have dropped from the program. | NR                   | Food package               | State: Connecticut and Massachusetts             | WIC food package intervention | Pre-WIC revision vs Post-WIC revision   |
| Andreyeva, 2013 <sup>54</sup> | Family/household   | Households that used WIC benefits in January 2009 were flagged as WIC and followed forward even if they no longer used WIC and might have dropped from the program. | NR                   | Food package               | State: Connecticut and Massachusetts             | WIC food package intervention | Pre-WIC revision vs Post-WIC revision   |

| Author, Year                  | WIC Exposure                                     | Definition of "Exposure to WIC"   | Duration of Exposure   | WIC Program Key Components | WIC Setting                           | Intervention   | Comparison/contrast  |
|-------------------------------|--|---|--|----------------------------|---------------------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | Family/household                                 | Households that used WIC benefits in January 2009 were flagged as WIC and followed forward even if they no longer used WIC and might have dropped from the program. | NR   | Food package               | State: Connecticut and Massachusetts  | WIC food package intervention  | Pre-WIC revision vs Post-WIC revision  |
| Andreyeva, 2015 <sup>56</sup> | Family/household                                 | Households that used WIC benefits when shopping   | NR   | Food package               | State: Connecticut and Massachusetts  | WIC food package intervention  | Pre-WIC revision vs Post-WIC revision  |
| Chaparro, 2019 <sup>57</sup>  | Infant(0-1), Infant(0-1), Child(1-2), Child(2-5) | Participated in WIC   | Full dose: Received WIC throughout 0-4 years of age; Late dose: Received WIC through 2-4 years of age only | Food package               | State: California, Los Angeles County | Full dose (old package), Full dose (new package), Late dose (old package), Late dose (new package) | Full dose (old package), Full dose (new package), Late dose (old package), Late dose (new package) |

| Author, Year                 | WIC Exposure                                      | Definition of "Exposure to WIC"                          | Duration of Exposure   | WIC Program Key Components | WIC Setting                           | Intervention                      | Comparison/contrast  |
|------------------------------|---|--|--|----------------------------|---------------------------------------|-----------------------------------|--|
| Chaparro, 2019 <sup>58</sup> | Infant(0-1), Infant(0-1), Child (1-2), Child(2-5) | Participated in WIC                                      | Old food package: enrolled at birth and turned 5 before October 1, 2009; New food package: enrolled at birth after October 1, 2009   | Food package               | State: California, Los Angeles County | New WIC package stratified by WHZ | Low WHZ (old package), Low WHZ (new package), Average WHZ (old package), Average WHZ(new package), High WHZ (old package), High WHZ (new package). Low WHZ $\leq 25^{\text{th}}$ pct, Average WHZ $\geq 25^{\text{th}}$ pct and $< 75^{\text{th}}$ pct, High WHZ $\geq 75^{\text{th}}$ pct |
| Chaparro, 2020 <sup>59</sup> | Children 0-4 years                                | Exposure to new food package defined by duration exposed | Duration of exposure to new child food package categorized: 0 years; $>0$ to $<1$ years; 1 to $<2$ years; 2 to $<3$ years; 3 to $<4$ years; 4 years; Exposure to new infant food package | Food package               | State: California, Los Angeles County | NR                                | Examined association between outcomes and duration of new child food package receipt AND new infant package receipt  |



| <b>Author, Year</b>          | <b>WIC Exposure</b>                  | <b>Definition of “Exposure to WIC”</b>  | <b>Duration of Exposure</b> | <b>WIC Program Key Components</b> | <b>WIC Setting</b>                    | <b>Intervention</b>  | <b>Comparison/contrast</b>   |
|------------------------------|--------------------------------------|---|-----------------------------|-----------------------------------|---------------------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Infant(0-1), Child (1-2), Child(2-5) | Participated in WIC   | NR                          | Food package                      | State: California, Los Angeles County | Fully formula, mostly formula, mostly breastfeed, fully breastfeed, stratified by received mixture of old and new WIC package, received only new WIC package | Fully formulas mostly formula vs mostly breastfeed vs fully breastfeed, stratified by received only old, received mix, received only new WIC package   |
| Chaparro, 2020 <sup>61</sup> | Child 0 through 4 years              | Child participating in WIC from birth to 4 years, and exposure also defined as old versus new food packageB | Birth to 4 years            | Food package                      | Other: Los Angeles County, CA         | Not applicable   | Pre and Post Food Package  |
| Chiasson, 2016 <sup>62</sup> | Infant(0-1), Child (1-2), Child(2-5) | Enrolled at birth or shortly thereafter in the NYS WIC Program  | NR                          | Food package                      | State: New York                       | New WIC package  | Old vs New WIC package participation   |
| Daepp, 2019 <sup>63</sup>    | Child 2-4 years                      | as per WIC-PC data for WIC participating children   | NR                          | Food package                      | National                              | NR   | Examined outcome (obesity prevalence at state level among 2-4 years) as a function of exposure to 2009 WIC package revision. They performed a trend analysis examining the state level obesity prevalence of WIC participants 2-4 years old over time before and after 2009 package revision, adjusting for race/ethnicity, state level poverty levels, and in sub analyses by maternal BMI. |

| Author, Year                   | WIC Exposure  | Definition of "Exposure to WIC"   | Duration of Exposure | WIC Program Key Components | WIC Setting  | Intervention                                      | Comparison/contrast   |
|--------------------------------|---|---|----------------------|----------------------------|--|---|---|
| Freedman, 2017 <sup>64</sup>   | Caregivers/guardians of children participating in WIC, Infant(0-1), 3-23 month old    | Participated and examined in biennial census in WIC program   | NR                   | Not specify                | National   | Trends  | Trends data, offers contrast between pre and post 2009 food package               |
| Guthrie, 2020 <sup>65</sup>    | Child, <48 months   | Caregiver report of child WIC participation at time of survey   | NR                   | Food package               | National   | NR  | Compared WIC participant vs non-participant; and also between years 2008 and 2016 |
| Ishdorj, 2013 <sup>66</sup>    | Child(2-5)  | Participants were recruited from WIC clinics  | NR                   | Not specify                | Other: State and ITO   | WIC participation post-2009 (years 2010 and 2011) | WIC participation in 2009   |
| Joyce, 2015 <sup>67</sup>      | PRAMS: pregnant women; NIS children 19-35 months; PedNSS children (age not specified) | PRAMS: women who participated in WIC during pregnancy (self-reported); NIS: child ever received WIC benefits self-reported; PedNSS: children reported to participate in WIC | NR                   | Food package               | National: PRAMS data is from 19 states AL, AR, CO, GA, HI, ME, MD, MI, MN, NE, NJ, NY, OK, OR, RI, UT, VT, WA, WV; PedNSS data is for 16 states CO, KS, KY, MD, MI, MN, MS, MT, NY, OH, OR, PA, RI, SC, TN, TX, WI | Trend   | Trend   |
| Kong, 2014 <sup>19</sup>       | Child(2-5)  | enrolled in WIC at baseline and at follow-up  | 18 months            | Not specify                | State, Local WIC agency: Illinois Chicago  | policy change                                     | Pre to post 2009 food package change  |
| Langellier, 2014 <sup>68</sup> | Infant(0-1)   | Years enrolled in WIC   | NR                   | Food package               | Local WIC agency: Los Angeles County, California   | Pre-revision WIC                                  | Pre-revision vs Post-revision   |
| Lee, 2017 <sup>69</sup>        | Infant(0-1)   | Enrollment in the WIC Program   | NR                   | Food package               | State: New York  | Trend analysis                                    | Trend analysis  |

| <b>Author,<br/>Year</b>            | <b>WIC<br/>Exposure</b>  | <b>Definition of<br/>“Exposure to<br/>WIC”</b>   | <b>Duration of<br/>Exposure</b> | <b>WIC<br/>Program Key<br/>Components</b> | <b>WIC Setting</b>  | <b>Intervention</b>   | <b>Comparison/contrast</b>  |
|------------------------------------|--|--|---------------------------------|---|---|-----------------------|---|
| Meiqari,<br>2015 <sup>70</sup>     | Child(2-5)   | enrolled in WIC at baseline and at follow-up four weeks later  | 4 weeks                         | Not specify, Food package                 | Local WIC agency: Atlanta, Georgia  | policy change         | Pre to post 2009 food package change  |
| Morshed,<br>2015 <sup>71</sup>     | caregiver or someone in the household  | If caregiver or someone in the household received WIC benefits (over the past 3 years for pre-policy change; for the past 6 months in the post-policy change period"; did not assess duration o WIC. | NR                              | Not specify                               | State: New Mexico 16 Head Start sites in rural NM, predominantly Hispanic | NR                    | pre/post policy change  |
| Odoms-Young,<br>2014 <sup>72</sup> | Dyads: 2–3 year old Hispanic and African American children enrolled in WIC and their mothers | Child enrolled in WIC (recruited from 12 WIC clinics)  | NR                              | Food package                              | Other: Chicago City   | Child enrolled in WIC | Pre-post comparison (before WIC food package change and post WIC food package change) |
| Odoms-Young,<br>2014 <sup>72</sup> | Dyads  | child enrolled in WIC (recruited from 12 WIC clinics)  | NR                              | Food package                              | Other: Chicago City   | child enrolled in WIC | Pre-post comparison (before WIC food package change and post WIC food package change) |
| Pan,<br>2016 <sup>73, 74</sup>     | Child(2-5)   | Enrolled in WIC  | NR                              | Not specify                               | National  | WIC trends data       | WIC trends data   |

| Author, Year                 | WIC Exposure  | Definition of "Exposure to WIC"                             | Duration of Exposure                                | WIC Program Key Components | WIC Setting  | Intervention           | Comparison/contrast  |
|------------------------------|---|---|---|----------------------------|--|------------------------|--|
| Pan, 2021 <sup>75</sup>      | Caregiver s/guardian s of children participati ng in WIC, Infant(0-1), 3-23 month old | Participated and examined in biennial census in WIC program | NR  | Not specify                | National   | Trends                 | Trends data, continues data from Freedman, 2017 <sup>64</sup> offering contrast between pre and post 2009 food package |
| Thornton, 2014 <sup>76</sup> | Infant(0-1), Child (1-2)  | NR  | NR  | Not specify                | State: Texas   | NR                     | pre/post policy change   |
| Whaley, 2012 <sup>77</sup>   | postpartu m women and infants   | WIC food package issued during month of interest            | NR  | Food package               | Local WIC agency: Los Angeles County, California   | Pre-revision WIC       | Pre-revision vs Post-revision  |
| Whaley, 2012 <sup>21</sup>   | Pregnant women, Postpartu m, Caregiver s/guardian s of children participati ng in WIC | Participation in California WIC                             | Received services in July 2009 through January 2010 | Food package               | State: California  | Post-2009 WIC revision | Pre vs Post-WIC revision   |
| Wilde, 2012 <sup>78</sup>    | Dyads   | Enrolled in WIC and part of the administrative database     | NR  | Food package               | WIC agencies -US territories: California, Florida, Georgia, Idaho, Illinois, Minnesota, Rhode Island, Tennessee, Texas, and Utah | Pre-revision WIC       | Pre-revision vs Post-revision  |
| Zimmer, 2019 <sup>79</sup>   | Family/ho usehold   | Enrolled in WIC   | NR  | Food package               | National   | Post-revision          | Pre-revision vs post revision  |

A&R=assessment and referral; AL=Alabama; AR=Arkansas; CO=Colorado; FPL=federal poverty level; GA=Georgia; HI=Hawaii; ITO=Indian Tribal Organization; KS=Kansas; KY=Kentucky; MD=Maryland; ME=Maine; MI=Michigan; MN=Minnesota; MS=Mississippi; MT=Montana; NE=Nebraska; NJ=New Jersey; NR=not reported; NY=New York; OH=Ohio; OK=Oklahoma; OR=Oregon; PA=Pennsylvania; PedNSS=New York Pediatric Nutrition Surveillance System; PIR=poverty income ratio; PRAMS=Pregnancy Risk

Assessment Monitoring System; RI=Rhode Island; SC=South Carolina; TN=Tennessee; TX=Texas; UT=Utah; VT=Vermont; WA=Washington; WI=Wisconsin; WIC=Supplemental Nutrition Program for Women, Infants, and Children; WV=West Virginia

**Evidence Table D-9. Maternal age, race/ethnicity, education, relationship, and housing characteristics of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Arm   | Arm Name          | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age  | Race/Ethnicity, n (%)  | Education, n (%)   | Relationship Status<br>Relationship Status, n (%)   | Housing, n (%) |
|--------------------------|-------|-------------------|------------|---|--|--|--|---|----------------|
| Angle, 2018 <sup>1</sup> | Arm 1 | White live births | 641        | Postpartum: 641 (100)                         | Age at delivery<br>18-23: 1 (20.8%)<br>24-27: 2 (20.1%)<br>28-31: 4 (11.8%)<br>32-36: 36 (26.7%)<br>37+: 550 (19.1%)   | Non-Hispanic-White: 641 (100)<br>Non-Hispanic-Black or African American: 0 (0)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 0 (0) | Less than HS: 36 (57.6)<br>Less than or equal to HS: NR<br>HS/GED: 112 (43.2)<br>More than HS: 443 (10.3)<br>College: NR | Married/Partnered/Cohabiting: 536 (57.3)<br>Single: 57 (57.7)<br>Separated: NR<br>Other: NR | NR             |
| Angle, 2018 <sup>1</sup> | Arm 2 | White stillbirths | 205        | Postpartum: 205 (100)                         | Age at delivery<br>18-23: 65 (13.7%)<br>24-27: 29 (17.2%)<br>28-31: 18 (27.3%)<br>32-36: 42 (28.5%)<br>37+: 36 (37.6%) | Non-Hispanic-White: 205 (100)<br>Non-Hispanic-Black or African American: 0 (0)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 0 (0) | Less than HS: 22 (48.6)<br>Less than or equal to HS: NR<br>HS/GED: 46 (41.7)<br>More than HS: 122 (11.8)<br>College: NR  | Married/Partnered/Cohabiting: 168 (54.7)<br>Single: 23 (54.6)<br>Separated: NR<br>Other: NR | NR             |
| Angle, 2018 <sup>1</sup> | Arm 3 | Black live births | 331        | Postpartum: 331 (100)                         | Age at delivery<br>18-23: 1 (52%)<br>24-27: 2 (49.3%)<br>28-31: 2 (48.3%)<br>32-36: 18 (66.7%)<br>37+: 129 (50.7%)     | Non-Hispanic-White: 0 (0)<br>Non-Hispanic-Black or African American: 331 (100)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 0 (0) | Less than HS: 26 (65.8)<br>Less than or equal to HS: NR<br>HS/GED: 58 (57.8)<br>More than HS: 68 (43)<br>College: NR     | Married/Partnered/Cohabiting: 96 (99.5)<br>Single: 55 (57.7)<br>Separated: NR<br>Other: NR  | NR             |

| Author, Year             | Arm   | Arm Name             | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age  | Race/Ethnicity, n (%)  | Education, n (%)  | Relationship Status<br>Relationship Status, n (%)   | Housing, n (%) |
|--------------------------|-------|----------------------|------------|---|--|--|---|---|----------------|
| Angle, 2018 <sup>1</sup> | Arm 4 | Black stillbirths    | 123        | Postpartum: 123 (100)                         | Age at delivery<br>18-23: 70 (23.8%)<br>24-27: 13 (75.2%)<br>28-31: 19 (48.9%)<br>32-36: 15 (41.7%)<br>37+: 17 (26.9%) | Non-Hispanic-White: 0 (0)<br>Non-Hispanic-Black or African American: 123 (100)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 0 (0) | Less than HS: 26 (47)<br>Less than or equal to HS: NR<br>HS/GED: 44 (33.7)<br>More than HS: 62 (31.4)<br>College: NR    | Married/Partnered /Cohabiting: 83 (62.2)<br>Single: 51 (40.5)<br>Separated: NR<br>Other: NR   | NR             |
| Angle, 2018 <sup>1</sup> | Arm 5 | Hispanic live births | 666        | Postpartum: 666 (100)                         | Age at delivery<br>18-23: 2 (39.2%)<br>24-27: 4 (45.9%)<br>28-31: 5 (45.9%)<br>32-36: 51 (54.9%)<br>37+: 419 (51.8%)   | Non-Hispanic-White: 0 (0)<br>Non-Hispanic-Black or African American: 0 (0)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 666 (100) | Less than HS: 175 (57.7)<br>Less than or equal to HS: NR<br>HS/GED: 153 (58.7)<br>More than HS: 149 (38)<br>College: NR | Married/Partnered /Cohabiting: 401 (101.4)<br>Single: 79 (65.8)<br>Separated: NR<br>Other: NR | NR             |
| Angle, 2018 <sup>1</sup> | Arm 6 | Hispanic stillbirths | 205        | Postpartum: 205 (100)                         | Age at delivery<br>18-23: 62 (49.3%)<br>24-27: 34 (32.5%)<br>28-31: 27 (47.5%)<br>32-36: 49 (45%)<br>37+: 39 (56.4%)   | Non-Hispanic-White: 0 (0)<br>Non-Hispanic-Black or African American: 0 (0)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 205 (100) | Less than HS: 84 (61)<br>Less than or equal to HS: NR<br>HS/GED: 70 (43.7)<br>More than HS: 58 (29.6)<br>College: NR    | Married/Partnered /Cohabiting: 153 (93.5)<br>Single: 58 (50.5)<br>Separated: NR<br>Other: NR  | NR             |

| Author, Year            | Arm     | Arm Name  | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)  | Education, n (%)  | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|-------------------------|---------|---|------------|---|---|--|---|---|----------------|
| Baer, 2019 <sup>2</sup> | Arm 1   | Did not receive WIC benefits during pregnancy     | 1382275    | Pregnant: NR                                  | Not specified   | NR   | Less than HS: NR<br>Less than or equal to HS: NR<br>HS/GED: NR<br>More than HS: NR<br>College: NR                                   | NR  | NR             |
| Baer, 2019 <sup>2</sup> | Arm 2   | Received WIC benefits during pregnancy            | 1581613    | Pregnant: NR                                  | Not specified   | NR   | Less than HS: NR<br>Less than or equal to HS: NR<br>HS/GED: NR<br>More than HS: NR<br>College: NR                                   | NR  | NR             |
| Baer, 2019 <sup>2</sup> | Overall | Entire sample-live births in California 2007-2012 | 2963888    | Pregnant: 1430439 (100)                       | Not specified<br><18: 85717 (2.9%)<br>18-34: 2351645 (79.3%)<br>>34: 526415 (17.8%) | Non-Hispanic-White: 773352 (26.1)<br>Non-Hispanic-Black or African American: 158802 (5.4)<br>Asian: 366732 (12.4)<br>Other: 219646 (7.4)<br>NR | Less than HS: 708807 (23.9)<br>Less than or equal to HS: NR<br>HS/GED: 757846 (25.6)<br>More than HS: 1387778 (46.8)<br>College: NR | NR  | NR             |



| Author, Year                 | Arm   | Arm Name                             | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age  | Race/Ethnicity, n (%) | Education, n (%)   | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|------------------------------|-------|--------------------------------------|------------|---|--|-----------------------|--|---|----------------|
| Bersak, 2021 <sup>3</sup>    | Arm 1 | Non-WIC                              | 49018      | Pregnant: 49018 (19.3)                        | Age at delivery<br>Mean (SD): 25.17 (5.34) | NR                    | Less than HS: (30.2)<br>Less than or equal to HS: NR<br>HS/GED: NR<br>More than HS: (31.3)<br>College: (6.6) | NR  | NR             |
| Bersak, 2021 <sup>3</sup>    | Arm 2 | WIC                                  | 205132     | Pregnant: 205132 (80.7)                       | Age at delivery<br>Mean (SD): 23.84 (5.29) | NR                    | Less than HS: (32.5)<br>Less than or equal to HS: NR<br>HS/GED: NR<br>More than HS: (28.7)<br>College: (3.2) | NR  | NR             |
| Bolbocean, 2021 <sup>4</sup> | Arm 1 | Non-WIC participant during pregnancy | 1068       | NR  | NR   | NR                    | NR   | NR  | NR             |
| Bolbocean, 2021 <sup>4</sup> | Arm 2 | WIC participant during pregnancy     | 1068       | NR  | NR   | NR                    | NR   | NR  | NR             |

| Author, Year                     | Arm   | Arm Name                      | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age  | Race/Ethnicity, n (%)  | Education, n (%)   | Relationship Status<br>Relationship Status, n (%)   | Housing, n (%) |
|----------------------------------|-------|-------------------------------|------------|---|--|--|--|---|----------------|
| El-Bastawissi, 2007 <sup>5</sup> | Arm 1 | Eligible WIC non-participants | 10595      | Pregnant: 10595 (100)                         | Not specified<br><br><20: 1672 (15.8%)<br>20-34: 7958 (75.1%)<br>≥35: 965 (9.1%)   | White: 6714 (65.8)<br>Black or African American: 519 (5.1)<br>American Indian/Alaska Native: 382 (3.7)<br>Asian: 912 (8.9)<br>: 1697 (16.5)<br>Other: NR<br><br>NR | Less than HS: 2579 (27.2)<br>Less than or equal to HS: NR<br>HS/GED: 3672 (38.8)<br>More than HS: 2177 (23)<br>College: 1038 (11)      | Married/Partnered /Cohabiting: 5283 (50.1)<br>Single: 5265 (49.9)<br>Separated: NR<br>Other: NR   | NR             |
| El-Bastawissi, 2007 <sup>5</sup> | Arm 2 | WIC participants              | 29013      | Pregnant: 29013 (100)                         | Not specified<br><br><20: 6275 (21.6%)<br>20-34: 20929 (72.1%)<br>≥35: 1809 (6.2%) | White: 14879 (52.5)<br>Black or African American: 1692 (6)<br>American Indian/Alaska Native: 1236 (4.4)<br>Asian: 1693 (6)<br>: 8830 (31.2)<br>Other: NR<br><br>NR | Less than HS: 10941 (41.4)<br>Less than or equal to HS: NR<br>HS/GED: 10012 (37.9)<br>More than HS: 4385 (16.6)<br>College: 1070 (4.1) | Married/Partnered /Cohabiting: 12889 (44.6)<br>Single: 16011 (55.4)<br>Separated: NR<br>Other: NR | NR             |

| Author, Year              | Arm   | Arm Name                        | Baseline N | Maternal Category<br>Maternal Category, n (%)    | Age   | Race/Ethnicity, n (%)  | Education, n (%)  | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|---------------------------|-------|---------------------------------|------------|--|---|--|---|---|----------------|
| Fingar, 2017 <sup>6</sup> | Arm 1 | Did not redeem during pregnancy | 29169      | Postpartum: 10565 (36.2)                         | Not specified<br><br>≤19 yrs: 2621 (9%)<br>20-24 yrs: 8455 (29%)<br>25-34 yrs: 14382 (49.3%)<br>≥35 yrs: 3702 (12.7%)         | Non-Hispanic-White: 9294 (32.5)<br>Non-Hispanic-Black or African American: 2499 (8.7)<br>Non-Hispanic-Asian: 3021 (10.6)<br>Other: NR<br><br>Non-Hispanic: 12784 (44.6)<br>Hispanic: NR    | Less than HS: 7171 (25.7)<br>Less than or equal to HS: NR<br>HS/GED: 9610 (34.4)<br>More than HS: 11146 (39.9)<br>College: NR | NR  | NR             |
| Fingar, 2017 <sup>6</sup> | Arm 2 | Redeemed during pregnancy       | 207395     | Pregnant - Trimester Not Reported: 207,395 (100) | Not specified<br><br>≤19 yrs: 30084 (14.5%)<br>20-24 yrs: 64012 (30.9%)<br>25-34 yrs: 90168 (43.5%)<br>≥35 yrs: 23128 (11.2%) | Non-Hispanic-White: 22883 (11.2)<br>Non-Hispanic-Black or African American: 12627 (6.2)<br>Non-Hispanic-Asian: 10725 (5.2)<br>Other: NR<br><br>Non-Hispanic: 155136 (75.6)<br>Hispanic: NR | Less than HS: 89265 (44.5)<br>Less than or equal to HS: NR<br>HS/GED: 66233 (33)<br>More than HS: 45012 (22.5)<br>College: NR | NR  | NR             |

| Author, Year               | Arm     | Arm Name  | Baseline N                            | Maternal Category<br>Maternal Category, n (%)         | Age   | Race/Ethnicity, n (%)   | Education, n (%)   | Relationship Status<br>Relationship Status, n (%)   | Housing, n (%) |
|----------------------------|---------|---|---------------------------------------|---|---|---|--|---|----------------|
| Gleason, 2020 <sup>7</sup> | Overall | WIC participants; Participant-level data were weighted to represent the national population of infants whose mothers enrolled in WIC for the first time for that pregnancy during the enrollment period (July to November, 2013). | unweighted n=1,235; weighed n=319,083 | Pregnant: unweighted n=1,235; weighed n=319,083 (100) | Age at delivery<br><br>16-19: NR (weighted %=17%)<br>20-25: NR (weighted %=38.2%)<br>≥26: NR (weighted %=49.7%) | NR  | Less than HS: NR<br>Less than or equal to HS: NR (weighted %=59.5)<br>HS/GED: NR<br>More than HS: NR (weighted %=40.5)<br>College: NR  | Married/Partnered /Cohabiting: NR (weighted %=35.3)<br>Single: NR<br>Separated: NR<br>Other: Not married, n=NR (Not married, Weighted %=64.7) | NR             |
| Hamad, 2019 <sup>8</sup>   | Overall | Overall   | 1259                                  | Pregnant: 1259 (100)                                  | Not specified<br>Mean (SD): No WIC: 28.9 (SD 4.9), WIC 24.5 (SD 5.1)  | Black or African American: No WIC: 33.4%, WIC 86.8% (NR)<br>White/Other: No WIC: 66.6%, WIC 13.2% (NR)<br>Other: NR<br><br>NR | Less than HS: No WIC: 4.2%, WIC: 14.2% (NR)<br>Less than or equal to HS: NR<br>HS/GED: No WIC: 25.5%, WIC: 63.3% (NR)<br>More than HS: No WIC: 70.3%, WIC: 22.5% (NR)<br>College: NR | Married/Partnered /Cohabiting: NR (No WIC: 86.1%, WIC: 38.5%)<br>Single: NR<br>Separated: NR<br>Other: NR                                     | NR             |

| Author, Year             | Arm   | Arm Name                         | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)  | Education, n (%) | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|--------------------------|-------|----------------------------------|------------|---|---|--|------------------|---|----------------|
| Kasim, 2021 <sup>9</sup> | Arm 1 | Wic Eligible w/ Medicaid - total | NR         | Pregnant: 145888 (NR)                         | Not specified<br><br><20: NR (0.201%)<br>20–24: NR (0.37%)<br>25–34: NR (0.362%)<br>35: NR (0.067)  | Black or African American: 3,424 (8.5 (28.5))<br>American Indian/Alaska Native: 198 (1.7)<br>Asian: 119 (1)<br>White: 3217 (26.7)<br><br>Non-Hispanic: NR<br>Hispanic: 5069 (42.2) | NR               | NR  | NR             |
| Kasim, 2021 <sup>9</sup> | Arm 2 | WIC recipients w/ medicaid       | NR         | Pregnant: 116062 (NR)                         | Not specified<br><br><20: NR (0.216%)<br>20–24: NR (0.375%)<br>25–34: NR (0.346%)<br>35: NR (0.062) | Black or African American: 45250 (22)<br>American Indian/Alaska Native: 3063 (1.5)<br>Asian: 2699 (1.3)<br>White: 85019 (41.4)<br><br>Non-Hispanic: NR<br>Hispanic: 69406 (33.8)   | NR               | NR  | NR             |

| Author, Year             | Arm   | Arm Name                                     | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)  | Education, n (%) | Relationship Status<br>Relationship Status, n (%)                                    | Housing, n (%) |
|--------------------------|-------|--|------------|---|---|--|------------------|--|----------------|
| Kasim, 2021 <sup>9</sup> | Arm 3 | WIC eligible w/ Medicaid - non WIC recipient | NR         | Pregnant: 29826 (NR)                          | Not specified<br><br><20: NR (0.143%)<br>20–24: NR (0.348%)<br>25-34: NR (0.423%)<br>35: NR (0.086) | Black or African American: 138311 (12.4)<br>American Indian/Alaska Native: 6838 (0.6)<br>Asian: 97815 (8.6)<br>White: 672988 (60.4)<br><br>Non-Hispanic: NR<br>Hispanic: 200272 (17.9) | NR               | NR   | NR             |
| Ma, 2014 <sup>10</sup>   | Arm 1 | Income-eligible, non-WIC participants        | 214        | Pregnant: 214 (100)                           | Not specified<br><br>≤20: NR (10.8%)<br>20-29: NR (53.6%)<br>≥30: NR (35.6%)                        | Non-Hispanic-Black or African American: NR (26.8)<br>Non-Hispanic-White: NR (53.5)<br>Other: NR (19.7)<br><br>NR   | NR               | Married/Partnered /Cohabiting: NR (61.1)<br>Single: NR<br>Separated: NR<br>Other: NR | NR             |
| Ma, 2014 <sup>10</sup>   | Arm 2 | WIC participants                             | 1024       | Pregnant: 1024 (100)                          | Not specified<br><br>≤20: NR (36.6%)<br>20-29: NR (46.4%)<br>≥30: NR (17.1%)                        | Non-Hispanic-Black or African American: NR (44.3)<br>Non-Hispanic-White: NR (43.9)<br>Other: NR (11.8)<br><br>NR   | NR               | Married/Partnered /Cohabiting: NR (31.2)<br>Single: NR<br>Separated: NR<br>Other: NR | NR             |

| Author, Year                        | Arm   | Arm Name   | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)   | Education, n (%) | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|-------------------------------------|-------|--|------------|---|---|---|------------------|---|----------------|
| McCoy, 2018 (study A) <sup>11</sup> | Arm 1 | Not assigned a peer prenatally (reference group) | 345        | Pregnant: 345 (100)                           | Not specified<br>Mean (SD): 26.6 (NR)<br><25: 164 (48%)<br>25-30: 98 (28%)<br>>30: 83 (24%) | Non-Hispanic - American Indian/Alaska Native: 10 (3)<br>Non-Hispanic-Asian: 41 (12)<br>Non-Hispanic-Black or African American: 66 (19)<br>Non-Hispanic-Black or African American: 45 (13)<br>Non-Hispanic-White: 119 (34)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 64 (19) | NR               | NR  | NR             |

| Author, Year                        | Arm   | Arm Name                                  | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)   | Education, n (%) | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|-------------------------------------|-------|---|------------|---|---|---|------------------|---|----------------|
| McCoy, 2018 (study A) <sup>11</sup> | Arm 2 | Assigned a peer, but no prenatal services | 733        | Pregnant: 733 (100)                           | Not specified<br>Mean (SD): 26.2 (NR)<br><25: 335 (46%)<br>25-30: 228 (31%)<br>>30: 170 (23%) | Non-Hispanic - American Indian/Alaska Native: 30 (4)<br>Non-Hispanic-Asian: 125 (17)<br>Non-Hispanic-Black or African American: 158 (22)<br>Non-Hispanic-Black or African American: 64 (9)<br>Non-Hispanic-White: 191 (26)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 165 (23) | NR               | NR  | NR             |



| Author, Year                        | Arm   | Arm Name                                       | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)   | Education, n (%) | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|-------------------------------------|-------|--|------------|---|---|---|------------------|---|----------------|
| McCoy, 2018 (study A) <sup>11</sup> | Arm 3 | Assigned a peer and received prenatal services | 1141       | Pregnant: 1141 (100)                          | Not specified<br>Mean (SD): 27 (NR)<br><25: 474 (42%)<br>25-30: 336 (29%)<br>>30: 331 (29%) | Non-Hispanic - American Indian/Alaska Native: 38 (3)<br>Non-Hispanic-Asian: 96 (8)<br>Non-Hispanic-Black or African American: 165 (14)<br>Non-Hispanic-Black or African American: 113 (10)<br>Non-Hispanic-White: 448 (39)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 281 (25) | NR               | NR  | NR             |

| Author, Year                        | Arm   | Arm Name  | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)   | Education, n (%) | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|-------------------------------------|-------|---|------------|---|---|---|------------------|---|----------------|
| McCoy, 2018 (study B) <sup>11</sup> | Arm 1 | Did not receive peer services at any time point | 558        | Breastfeeding with infants: 558 (100)         | Not specified<br>Mean (SD): 26.6 (NR)<br><25: 256 (46%)<br>25-30: 171 (31%)<br>>30: 131 (23%) | Non-Hispanic - American Indian/Alaska Native: 20 (4)<br>Non-Hispanic-Asian: 72 (13)<br>Non-Hispanic-Black or African American: 115 (21)<br>Non-Hispanic-Black or African American: 72 (13)<br>Non-Hispanic-White: 163 (29)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 116 (21) | NR               | NR  | NR             |

| Author, Year                        | Arm     | Arm Name               | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)  | Education, n (%)   | Relationship Status<br>Relationship Status, n (%)   | Housing, n (%)  |
|-------------------------------------|---------|------------------------|------------|---|---|--|--|---|---|
| McCoy, 2018 (study B) <sup>11</sup> | Arm 2   | Received peer services | 1342       | Breastfeeding with infants: 1342 (100)        | Not specified<br>Mean (SD): 27 (NR)<br><25: 536 (40%)<br>25-30: 409 (31%)<br>>30: 397 (30%) | Non-Hispanic - American Indian/Alaska Native: 41 (3)<br>Non-Hispanic-Asian: 116 (9)<br>Non-Hispanic-Black or African American: 193 (14)<br>Non-Hispanic-Black or African American: 142 (11)<br>Non-Hispanic-White: 494 (37)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: 356 (27) | NR   | NR  | NR  |
| Rhee, 2019 <sup>12</sup>            | Overall | Overall                | 3366       | Postpartum: 3366 (100)                        | Not specified<br>Median (SD): 27 (NR)   | Non-Hispanic-White: 346 (10.3)<br>Non-Hispanic-Black or African American: 1693 (50.3)<br>Other: 207 (6.1)<br><br>Non-Hispanic: 2246 (66.7)<br>Hispanic: 1120 (33.3)  | Less than HS: NR<br>Less than or equal to HS: NR (1771)<br>HS/GED: 52.6 (NR)<br>More than HS: 1595 (47.4)<br>College: NR | Married/Partnered /Cohabiting: 1158 (34.4)<br>Single: 1828 (54.3)<br>Separated: 380 (11.3)<br>Other: NR | Stable: NR<br>Unstable: NR<br>Homeless: 524 (15.6)<br>not homeless/in shelter in pregnancy: 2842 (84.4) |

| Author, Year                | Arm     | Arm Name      | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age                                      | Race/Ethnicity, n (%)   | Education, n (%)  | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|-----------------------------|---------|---------------|------------|---|--|---|---|---|----------------|
| Sonchak, 2016 <sup>13</sup> | Overall | Overall arm   | 102079     | Pregnant: 102079 (100)                        | Not specified<br>Mean (SD): 23.25 (NR)   | Black or African American: NR (54.59)<br>White: NR (45.41)<br>Other: NR<br><br>NR | Less than HS: NR (36.1)<br>Less than or equal to HS: NR<br>HS/GED: NR (36.65)<br>More than HS: NR (24.99)<br>College: NR (2.11) | NR  | NR             |
| Sonchak, 2017 <sup>14</sup> | Arm 1   | White Non-WIC | 34560      | Postpartum: 34560 (100)                       | Not specified<br>Mean (SD): 25.87 (5.53) | NR  | Less than HS: NR (28)<br>Less than or equal to HS: NR<br>HS/GED: NR (29)<br>More than HS: NR (44)<br>College: NR (11)           | NR  | NR             |
| Sonchak, 2017 <sup>14</sup> | Arm 2   | White WIC     | 106067     | Postpartum: 106067 (100)                      | Not specified<br>Mean (SD): 23.95 (5.32) | NR  | Less than HS: NR (37)<br>Less than or equal to HS: NR<br>HS/GED: NR (35)<br>More than HS: NR (29)<br>College: NR (3)            | NR  | NR             |

| Author, Year                | Arm     | Arm Name      | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age                                      | Race/Ethnicity, n (%)   | Education, n (%)   | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|-----------------------------|---------|---------------|------------|---|--|---|--|---|----------------|
| Sonchak, 2017 <sup>14</sup> | Arm 3   | Black Non-WIC | 20793      | Postpartum: 20793 (100)                       | Not specified<br>Mean (SD): 24.62 (5.14) | NR  | Less than HS: NR (31)<br>Less than or equal to HS: NR<br>HS/GED: NR (34)<br>More than HS: NR (34)<br>College: NR (5) | NR  | NR             |
| Sonchak, 2017 <sup>14</sup> | Arm 4   | Black WIC     | 109676     | Postpartum: 109676 (100)                      | Not specified<br>Mean (SD): 23.81 (5.25) | NR  | Less than HS: NR (28)<br>Less than or equal to HS: NR<br>HS/GED: NR (36)<br>More than HS: NR (36)<br>College: NR (4) | NR  | NR             |
| Sonchak, 2017 <sup>14</sup> | Overall | Overall       | 275482     | Postpartum: 275482 (100)                      | Not specified<br>Mean (SD): 24.22 (5.37) | Black or African American: NR (47)<br>Other: NR (2)<br><br>NR | Less than HS: NR (32)<br>Less than or equal to HS: NR<br>HS/GED: NR (34)<br>More than HS: NR (31)<br>College: NR (4) | NR  | NR             |

| Author, Year               | Arm   | Arm Name                                      | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age  | Race/Ethnicity, n (%)   | Education, n (%)  | Relationship Status<br>Relationship Status, n (%)   | Housing, n (%) |
|----------------------------|-------|---|------------|---|--|---|---|---|----------------|
| Soneji, 2019 <sup>15</sup> | Arm 1 | Did not receive WIC benefits during pregnancy | 2815304    | Pregnant: 2815304 (100)                       | Age at delivery<br><15: 2780 (0.1%)<br>15-19: 214542 (7.6%)<br>20-24: 838695 (29.8%)<br>25-59: 890217 (31.6%)<br>30-34: 561596 (19.9%)       | Non-Hispanic-White: 1324811 (47.1)<br>Non-Hispanic-Black or African American: 586573 (20.8)<br>: 216759 (7.7)<br>Other: 216579 (7.7)<br><br>Non-Hispanic: NR<br>Hispanic: 667828 (23.7)   | Less than HS: 567817 (20.2)<br>Less than or equal to HS: NR<br>HS/GED: 961653 (34.2)<br>More than HS: 1250751 (44.4)<br>College: NR   | Married/Partnered /Cohabiting: 1104843 (39.2)<br>Single: 1666983 (59.2)<br>Separated: NR<br>Other: NR | NR             |
| Soneji, 2019 <sup>15</sup> | Arm 2 | Received WIC benefits during pregnancy        | 8145770    | Pregnant: 8145770 (100)                       | Age at delivery<br><15: 12047 (0.1%)<br>15-19: 1022293 (12.2%)<br>20-24: 2719455 (33.4%)<br>25-59: 2251694 (27.6%)<br>30-34: 1365272 (16.8%) | Non-Hispanic-White: 2861443 (35.1)<br>Non-Hispanic-Black or African American: 1822517 (22.4)<br>: 500188 (6.1)<br>Other: 500188 (6.1)<br><br>Non-Hispanic: NR<br>Hispanic: 2916154 (35.8) | Less than HS: 2311748 (28.4)<br>Less than or equal to HS: NR<br>HS/GED: 3101353 (38.1)<br>More than HS: 2649190 (32.5)<br>College: NR | Married/Partnered /Cohabiting: 2603649 (32)<br>Single: 5383992 (66.1)<br>Separated: NR<br>Other: NR   | NR             |

| Author, Year               | Arm     | Arm Name                               | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age   | Race/Ethnicity, n (%)   | Education, n (%)  | Relationship Status<br>Relationship Status, n (%)   | Housing, n (%) |
|----------------------------|---------|--|------------|---|---|---|---|---|----------------|
| Soneji, 2019 <sup>15</sup> | Overall | All medicaid-insured expectant mothers | 11148261   | Pregnant: 11148261 (100)                      | Age at delivery Mean (SD): NR, Range: 20-24 (mode)<br><15: 15114 (0.1%)<br>15-19: 1255749 (11.3%)<br>20-24: 3615605 (32.4%)<br>25-59: 3195789 (28.7%)<br>30-34: 1962324 (17.6%) | Non-Hispanic-White: 4257790 (38.2)<br>Non-Hispanic-Black or African American: 2458740 (22.1)<br>: 731013 (6.6)<br>Other: 731013 (6.6)<br><br>Non-Hispanic: NR<br>Hispanic: 3627356 (32.5) | Less than HS: 2922613 (26.2)<br>Less than or equal to HS: NR<br>HS/GED: 4130571 (37.1)<br>More than HS: 3957690 (35.5)<br>College: NR | Married/Partnered /Cohabiting: 3772251 (33.8)<br>Single: 7173141 (64.3)<br>Separated: NR<br>Other: NR | NR             |
| Testa, 2020 <sup>16</sup>  | Overall | No incarceration                       | 191460     | NR: 191460 (100)                              | Not specified<br><br>17 or younger: NR (0.016%)<br>18-24: NR (0.237%)<br>25-29: NR (0.299%)<br>30-34: NR (0.286%)<br>35+: NR (0.162%)   | White: NR (0.615)<br>Black or African American: NR (0.116)<br>Other: NR (0.084)<br><br>Non-Hispanic: NR<br>Hispanic: NR (0.184)   | Less than HS: NR<br>Less than or equal to HS: NR<br>HS/GED: NR<br>More than HS: NR<br>College: NR (0.359)                             | Married/Partnered /Cohabiting: NR (0.649)<br>Single: NR<br>Separated: NR<br>Other: NR                 | NR             |
| Testa, 2020 <sup>16</sup>  | Overall | Incarceration                          | 8759       | NR: 8759 (100)                                | Not specified<br><br>17 or younger: NR (0.031%)<br>18-24: NR (0.484%)<br>25-29: NR (0.276%)<br>30-34: NR (0.142%)<br>35+: NR (0.067%)   | White: NR (51.5)<br>Black or African American: NR (0.236)<br>Other: NR (0.072)<br><br>Non-Hispanic: NR<br>Hispanic: NR (0.177)  | Less than HS: NR<br>Less than or equal to HS: NR<br>HS/GED: NR<br>More than HS: NR<br>College: NR (0.06)                              | Married/Partnered /Cohabiting: NR (0.218)<br>Single: NR<br>Separated: NR<br>Other: NR                 | NR             |

GED=General Education Development; HS=high school; n=sample size; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-10. Maternal age, race/ethnicity, education, relationship, and housing characteristics of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Arm   | Arm Name                                     | Baseline N                    | Maternal CategoryMaternal Category, n (%) | Age   | Race/Ethnicity, n (%)  | Education, n (%)   | Relationship StatusRelationship Status, n (%) | Housing, n (%) |
|---------------------------|-------|--|-------------------------------|---|---|--|--|---|----------------|
| Hamad, 2019 <sup>18</sup> | Arm 1 | Infant born before WIC food package revision | No WIC: 716675<br>WIC: 821878 | NR  | Age at delivery<br>Mean (SD): No WIC: 30.4 (SD 5.7), WIC: 26.0 (SD 6.2) | Non-Hispanic-White: No WIC: 303368 (42.3%)<br>WIC: 92081 (11.2%)<br>Non-Hispanic-Black or African American: No WIC: 28162 (3.9%)<br>WIC: 53654 (6.5%)<br>Non-Hispanic-Asian: No WIC: 141048 (19.7%)<br>WIC: 45315 (5.5%)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: No WIC: 195834 (27.3%)<br>WIC: 577860 (70.3%) | Less than HS: No WIC: 51479 (7.4%)<br>WIC: 350035 (44.0%)<br>Less than or equal to HS: NR<br>HS/GED: No WIC: 135537 (19.6%)<br>WIC: 263671 (33.1%)<br>More than HS: No WIC: 505145 (73.0%)<br>WIC: 182332 (22.9%)<br>College: NR | NR  | NR             |

| Author, Year              | Arm   | Arm Name                                    | Baseline N                    | Maternal Category<br>Maternal Category, n (%) | Age  | Race/Ethnicity, n (%)  | Education, n (%)  | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|---------------------------|-------|---|-------------------------------|---|--|--|---|---|----------------|
| Hamad, 2019 <sup>18</sup> | Arm 2 | Infant born after WIC food package revision | No WIC: 611817<br>WIC: 747167 | NR  | Age at delivery Mean (SD): No WIC: 30.9 (SD 5.4), WIC: 26.5 (SD 6.2) | Non-Hispanic-White: No WIC: 264405 (43.2%)<br>WIC: 94983 (12.7%)<br>Non-Hispanic-Black or African American: No WIC: 21396 (3.5%)<br>WIC: 51753 (6.9%)<br>Non-Hispanic-Asian: No WIC: 129011 (21.1%)<br>WIC: 45662 (6.1%)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: No WIC: 149426 (24.4%)<br>WIC: 490965 (65.7%) | Less than HS: No WIC: 30198 (5.2%)<br>WIC: 261292 (36.3%)<br>Less than or equal to HS: NR<br>HS/GED: No WIC: 93264 (15.9%)<br>WIC: 245910 (34.1%)<br>More than HS: No WIC: 463251 (79.0%)<br>WIC: 213115 (29.6%)<br>College: NR | NR  | NR             |

| Author, Year               | Arm   | Arm Name           | Baseline N                 | Maternal CategoryMaternal Category, n (%)   | Age   | Race/Ethnicity, n (%)   | Education, n (%)   | Relationship StatusRelationship Status, n (%)   | Housing, n (%) |
|----------------------------|-------|--------------------|----------------------------|---|---|---|--|---|----------------|
| Oberle, 2020 <sup>20</sup> | Arm 1 | Before WIC changes | 231 (representing 951,481) | Pregnant: 32% (25.3, 39.6)<br>Breastfeeding: 25.4% (16.8, 36.4)<br>Postpartum: 16.9% (12.4, 22.5) | Not specified<br><br>18-25: NR (60.5% (50.7, 69.6))<br>26-35: NR (32% (24.6, 40.4))<br>36-40: NR (7.5% (3.7, 14.5)) | Non-Hispanic-White: NR (34.2% (23, 47.3))<br>Non-Hispanic-Black or African American: NR (23.3% (15.5, 33.5))<br>Other: NR (5.7% (1.6, 18.3))<br><br>Non-Hispanic: NR<br>Hispanic: Mexican American<br>Other Hispanic (33% (24.1, 43.4)<br>3.8% (1.4, 10)) | Less than HS: NR (11.5% (6.6, 19.3))<br>Less than or equal to HS: NR (26.4% (19, 35.4))<br>HS/GED: NR (33.4% (26.8, 40.7))<br>More than HS: NR (26.3% (19.4, 34.6))<br>College: NR (2.4% (0.6, 9.2)) | Married/Partnered /Cohabiting: Living with a partner: (69.4% (59, 78.8))<br>Single: NR<br>Separated: NR<br>Other: Not living with a partner: (30.6% (21.2, 42)) | NR             |

| Author, Year               | Arm   | Arm Name          | Baseline N                | Maternal CategoryMaternal Category, n (%)  | Age   | Race/Ethnicity, n (%)  | Education, n (%)   | Relationship StatusRelationship Status, n (%)   | Housing, n (%) |
|----------------------------|-------|-------------------|---------------------------|--|---|--|--|---|----------------|
| Oberle, 2020 <sup>20</sup> | Arm 2 | After WIC changes | 81 (representing 711,350) | Pregnant: 27.6% (15.8, 43.5)<br>Breastfeeding: 22.3% (14.1, 33.3)<br>Postpartum: 18% (8.4, 34.5) | Not specified<br><br>18-25: NR (51.8% (37.5, 65.7))<br>26-35: NR (40.8% (29.9, 52.7))<br>36-40: NR (7.4% (3.1, 16.9)) | Non-Hispanic-White: NR (39.4% (28.9, 51))<br>Non-Hispanic-Black or African American: NR (20.4% (13.1, 30.5))<br>Other: NR (9.1% (5.6, 14.5))<br><br>Non-Hispanic: NR<br>Hispanic: Mexican American<br>Other Hispanic (19.7% (12.4, 30)<br>11.3% (6.5, 18.8)) | Less than HS: NR (3.5% (0.8, 14.6))<br>Less than or equal to HS: NR (27.1% (18, 38.6))<br>HS/GED: NR (32% (22.1, 43.8))<br>More than HS: NR (31.3% (22.6, 41.6))<br>College: NR (6.1% (2.1, 16.7)) | Married/Partnered /Cohabiting: Living with a partner: (69.6% (57.7, 79.4))<br>Single: NR<br>Separated: NR<br>Other: Not living with a partner: (30.4% (20.6, 42.3)) | NR             |
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC  | 3004                      | Pregnant: NR (8.9)   | Not specified<br>Mean (SD): 29.2 (6.89)   | NR   | Less than HS: NR (45.7)<br>Less than or equal to HS: NR<br>HS/GED: NR (29.1)<br>More than HS: NR (25)<br>College: NR   | NR  | NR             |

| Author, Year               | Arm   | Arm Name          | Baseline N | Maternal Category<br>Maternal Category, n (%) | Age                                     | Race/Ethnicity, n (%) | Education, n (%)   | Relationship Status<br>Relationship Status, n (%) | Housing, n (%) |
|----------------------------|-------|-------------------|------------|---|---|-----------------------|--|---|----------------|
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC | 2996       | Pregnant: NR (8.9)                            | Not specified<br>Mean (SD): 29.4 (6.74) | NR                    | Less than HS: NR (43.1)<br>Less than or equal to HS: NR<br>HS/GED: NR (29.9)<br>More than HS: NR (26.5)<br>College: NR | NR  | NR             |

GED=General Education Development; HS=high school; n=sample size; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-11. Maternal employment, geography, parity, pregnancy, maternal health characteristics of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Arm   | Arm Name          | Baseline N | Employment, n (%) | Geography, n (%) | Parity, n                            | Pregnancy BMI, n (%)   | Maternal Health History, n (%)   | Maternal MorbiditiesMaternal Morbidities, n (%) |
|---------------------------|-------|-------------------|------------|-------------------|------------------|--------------------------------------|--|--|---|
| Angley, 2018 <sup>1</sup> | Arm 1 | White live births | 641        | NR                | NR               | Primiparous: 240<br>Multiparous: 354 | NR<br>Underweight: NR<br>Normal: NR<br>Overweight: NR<br>Obese: 113 (25.8) | Pre-existing DM: 9 (10.7)<br>Prior GDM: NR<br>Prior HT: 35 (18.7)<br>Depression: NR<br>Substance abuse: NR | NR  |
| Angley, 2018 <sup>1</sup> | Arm 2 | White stillbirths | 205        | NR                | NR               | Primiparous: 88<br>Multiparous: 103  | NR<br>Underweight: NR<br>Normal: NR<br>Overweight: NR<br>Obese: 57 (28.4)  | Pre-existing DM: 9 (31.8)<br>Prior GDM: NR<br>Prior HT: 19 (14.7)<br>Depression: NR<br>Substance abuse: NR | NR  |
| Angley, 2018 <sup>1</sup> | Arm 3 | Black live births | 331        | NR                | NR               | Primiparous: 56<br>Multiparous: 96   | NR<br>Underweight: NR<br>Normal: NR<br>Overweight: NR<br>Obese: 34 (43.6)  | Pre-existing DM: 2 (0)<br>Prior GDM: NR<br>Prior HT: 12 (40.5)<br>Depression: NR<br>Substance abuse: NR    | NR  |

| Author, Year             | Arm   | Arm Name                                      | Baseline N | Employment, n (%) | Geography, n (%) | Parity, n                            | Pregnancy BMI, n (%)   | Maternal Health History, n (%)   | Maternal MorbiditiesMaternal Morbidities, n (%) |
|--------------------------|-------|---|------------|-------------------|------------------|--------------------------------------|--|--|---|
| Angle, 2018 <sup>1</sup> | Arm 4 | Black stillbirths                             | 123        | NR                | NR               | Primiparous: 56<br>Multiparous: 78   | NR<br>Underweight: NR<br>Normal: NR<br>Overweight: NR<br>Obese: 41 (40.6)  | Pre-existing DM: 9 (22.9)<br>Prior GDM: NR<br>Prior HT: 18 (46.8)<br>Depression: NR<br>Substance abuse: NR | NR  |
| Angle, 2018 <sup>1</sup> | Arm 5 | Hispanic live births                          | 666        | NR                | NR               | Primiparous: 140<br>Multiparous: 341 | NR<br>Underweight: NR<br>Normal: NR<br>Overweight: NR<br>Obese: 137 (51.7) | Pre-existing DM: 8 (46.3)<br>Prior GDM: NR<br>Prior HT: 27 (55.5)<br>Depression: NR<br>Substance abuse: NR | NR  |
| Angle, 2018 <sup>1</sup> | Arm 6 | Hispanic stillbirths                          | 205        | NR                | NR               | Primiparous: 95<br>Multiparous: 117  | NR<br>Underweight: NR<br>Normal: NR<br>Overweight: NR<br>Obese: 70 (40.5)  | Pre-existing DM: 11 (72.4)<br>Prior GDM: NR<br>Prior HT: 15 (56)<br>Depression: NR<br>Substance abuse: NR  | NR  |
| Baer, 2019 <sup>2</sup>  | Arm 1 | Did not receive WIC benefits during pregnancy | 1382275    | NR                | NR               | NR                                   | NR   | NR   | NR  |

| Author, Year                 | Arm     | Arm Name  | Baseline N | Employment, n (%) | Geography, n (%)  | Parity, n                               | Pregnancy BMI, n (%)   | Maternal Health History, n (%)  | Maternal MorbiditiesMaternal Morbidities, n (%) |
|------------------------------|---------|---|------------|-------------------|---|---|--|---|---|
| Baer, 2019 <sup>2</sup>      | Arm 2   | Received WIC benefits during pregnancy            | 1581613    | NR                | NR  | NR                                      | NR   | NR  | NR  |
| Baer, 2019 <sup>2</sup>      | Overall | Entire sample-live births in california 2007-2012 | 2963888    | NR                | Urban: 1856574 (62.6)<br>Rural: NR<br>Suburban: NR<br>Mixed: NR | Primiparous: 1179477<br>Multiparous: NR | NR   | NR  | NR  |
| Bersak, 2021 <sup>3</sup>    | Arm 1   | Non-WIC   | 49018      | NR                | NR  | Primiparous: 12990<br>Multiparous: NR   | NR<br>Underweight: NR<br>Normal: NR<br>Overweight: NR<br>Obese: 27.1 | Pre-existing DM: (0.8)<br>Prior GDM: NR<br>Prior HT: (2.1)<br>Depression: NR<br>Substance abuse: NR | GDM: (4)<br>HT: (4.8)                           |
| Bersak, 2021 <sup>3</sup>    | Arm 2   | WIC   | 205132     | NR                | NR  | Primiparous: 91284<br>Multiparous: NR   | NR<br>Underweight: NR<br>Normal: NR<br>Overweight: NR<br>Obese: 32.3 | Pre-existing DM: (1)<br>Prior GDM<br>Prior HT: (2.5)<br>Depression: (NR)<br>Substance abuse: (NR)   | GDM: (4.6)<br>HT: (5.5)                         |
| Bolbocean, 2021 <sup>4</sup> | Arm 1   | Non-WIC participant during pregnancy              | 1068       | NR                | NR  | NR                                      | NR   | NR  | NR  |
| Bolbocean, 2021 <sup>4</sup> | Arm 2   | WIC participant during pregnancy                  | 1068       | NR                | NR  | NR                                      | NR   | NR  | NR  |



| Author, Year                     | Arm   | Arm Name                        | Baseline N | Employment, n (%) | Geography, n (%) | Parity, n                                | Pregnancy BMI, n (%)   | Maternal Health History, n (%)  | Maternal MorbiditiesMaternal Morbidities, n (%) |
|----------------------------------|-------|---------------------------------|------------|-------------------|------------------|--|--|---|---|
| El-Bastawissi, 2007 <sup>5</sup> | Arm 1 | Eligible WIC non-participants   | 10595      | NR                | NR               | Primiparous: 4103<br>Multiparous: 6281   | NR   | Pre-existing DM: 53 (0.5)<br>Prior GDM: NR<br>Prior HT: 104 (1.1)<br>Depression: NR<br>Substance abuse: NR  | GDM: 267 (2.5)<br>HT: NR                        |
| El-Bastawissi, 2007 <sup>5</sup> | Arm 2 | WIC participants                | 29013      | NR                | NR               | Primiparous: 11833<br>Multiparous: 16875 | NR   | Pre-existing DM: 147 (0.5)<br>Prior GDM: NR<br>Prior HT: 232 (0.9)<br>Depression: NR<br>Substance abuse: NR | GDM: 1015 (3.5)<br>HT: NR                       |
| Fingar, 2017 <sup>6</sup>        | Arm 1 | Did not redeem during pregnancy | 29169      | NR                | NR               | Primiparous: 10472<br>Multiparous: 18414 | NR<br>Underweight: 1380 (5.1)<br>Normal: 13280 (49.4)<br>Overweight: 6862 (25.5)<br>Obese: 5346 (19.9) | Pre-existing DM: 253 (0.9)<br>Prior GDM: NR<br>Prior HT: 647 (2.3)<br>Depression: NR<br>Substance abuse: NR | NR  |

| Author, Year               | Arm     | Arm Name  | Baseline N                            | Employment, n (%) | Geography, n (%) | Parity, n                                 | Pregnancy BMI, n (%)   | Maternal Health History, n (%)  | Maternal MorbiditiesMaternal Morbidities, n (%) |
|----------------------------|---------|---|---------------------------------------|-------------------|------------------|---|--|---|---|
| Fingar, 2017 <sup>6</sup>  | Arm 2   | Redeemed during pregnancy   | 207395                                | NR                | NR               | Primiparous: 74877<br>Multiparous: 130870 | NR<br>Underweight: 6897 (3.6)<br>Normal: 81806 (42.2)<br>Overweight: 55622 (28.7)<br>Obese: 49381 (25.5) | Pre-existing DM: 2669 (1.3)<br>Prior GDM: NR<br>Prior HT: 3655 (1.8)<br>Depression: NR<br>Substance abuse: NR | NR  |
| Gleason, 2020 <sup>7</sup> | Overall | WIC participants; Participant-level data were weighted to represent the national population of infants whose mothers enrolled in WIC for the first time for that pregnancy during the enrollment period (July to November, 2013). | unweighted n=1,235; weighed n=319,083 | NR                | NR               | NR  | NR   | NR  | NR  |
| Hamad, 2019 <sup>8</sup>   | Overall | Overall   | 1259                                  | NR                | NR               | NR  | NR   | NR  | NR  |
| Kasim, 2021 <sup>9</sup>   | Arm 1   | WIC Eligible w/ Medicaid - total  | NR                                    | NR                | NR               | NR  | NR   | NR  | NR  |

| Author, Year                        | Arm   | Arm Name   | Baseline N | Employment, n (%) | Geography, n (%) | Parity, n                             | Pregnancy BMI, n (%)   | Maternal Health History, n (%) | Maternal MorbidityMaternal Morbidity, n (%)                                       |
|-------------------------------------|-------|--|------------|-------------------|------------------|---------------------------------------|--|--------------------------------|---|
| Kasim, 2021 <sup>9</sup>            | Arm 2 | WIC recipients w/ medicaid                       | NR         | NR                | NR               | NR                                    | NR   | NR                             | NR  |
| Kasim, 2021 <sup>9</sup>            | Arm 3 | WIC eligible w/ Medicaid - non WIC recipient     | NR         | NR                | NR               | NR                                    | NR   | NR                             | NR  |
| Ma, 2014 <sup>10</sup>              | Arm 1 | Income-eligible, non-WIC participants            | 214        | NR                | NR               | Primiparous: NR<br>Multiparous: 0.763 | NR   | NR                             | GDM: NR (5.4)<br>HT: NR (6.8)<br>Smoking in last 3 months of pregnancy: NR (12.9) |
| Ma, 2014 <sup>10</sup>              | Arm 2 | WIC participants                                 | 1024       | NR                | NR               | Primiparous: NR<br>Multiparous: 0.518 | NR   | NR                             | GDM: NR (5.4)<br>HT: NR (7.7)<br>Smoking in last 3 months of pregnancy: NR (20.6) |
| McCoy, 2018 (study A) <sup>11</sup> | Arm 1 | Not assigned a peer prenatally (reference group) | 345        | NR                | NR               | Primiparous: 134<br>Multiparous: NR   | Mean (SD): 27.2 (NR)<br>Underweight: 17 (5)<br>Normal: 131 (38)<br>Overweight: 98 (28)<br>Obese: 52 (15)   | NR                             | GDM: 8 (2)<br>HT: NR  |
| McCoy, 2018 (study A) <sup>11</sup> | Arm 2 | Assigned a peer, but no prenatal services        | 733        | NR                | NR               | Primiparous: 317<br>Multiparous: NR   | Mean (SD): 27.2 (NR)<br>Underweight: 25 (3)<br>Normal: 305 (42)<br>Overweight: 185 (25)<br>Obese: 112 (15) | NR                             | GDM: 9 (1)<br>HT: NR  |

| Author, Year                        | Arm     | Arm Name  | Baseline N | Employment, n (%) | Geography, n (%)  | Parity, n                           | Pregnancy BMI, n (%)   | Maternal Health History, n (%) | Maternal MorbiditiesMaternal Morbidities, n (%) |
|-------------------------------------|---------|---|------------|-------------------|---|-------------------------------------|--|--------------------------------|---|
| McCoy, 2018 (study A) <sup>11</sup> | Arm 3   | Assigned a peer and received prenatal services  | 1141       | NR                | NR  | Primiparous: 487<br>Multiparous: NR | Mean (SD): 27.6 (NR)<br>Underweight: 41 (4)<br>Normal: 446 (39)<br>Overweight: 303 (27)<br>Obese: 172 (15) | NR                             | GDM: 36 (3)<br>HT: NR                           |
| McCoy, 2018 (study B) <sup>11</sup> | Arm 1   | Did not receive peer services at any time point | 558        | NR                | NR  | Primiparous: 234<br>Multiparous: NR | Mean (SD): 27.3 (NR)<br>Underweight: 21 (4)<br>Normal: 217 (39)<br>Overweight: 144 (26)<br>Obese: 89 (16)  | NR                             | GDM: 9 (2)<br>HT: NR                            |
| McCoy, 2018 (study B) <sup>11</sup> | Arm 2   | Received peer services                          | 1342       | NR                | NR  | Primiparous: 571<br>Multiparous: NR | Mean (SD): 27.5 (NR)<br>Underweight: 48 (4)<br>Normal: 536 (40)<br>Overweight: 360 (27)<br>Obese: 200 (14) | NR                             | GDM: 37 (3)<br>HT: NR                           |
| Perkins, 2020 <sup>42</sup>         | Overall | Adult EFNEP participants                        | 507        | NR                | Urban: 156 (30.8)<br>Rural: NR<br>Suburban: 351 (69.2)<br>Mixed: NR | NR                                  | NR   | NR                             | NR  |

| Author, Year                | Arm     | Arm Name      | Baseline N | Employment, n (%) | Geography, n (%) | Parity, n                              | Pregnancy BMI, n (%)          | Maternal Health History, n (%)  | Maternal MorbiditiesMaternal Morbidities, n (%)       |
|-----------------------------|---------|---------------|------------|-------------------|------------------|--|-------------------------------|---|---|
| Rhee, 2019 <sup>12</sup>    | Overall | Overall       | 3366       | NR                | NR               | NR                                     | Mean (SD): 27.1 (IQR: 8.3) NR | NR  | NR  |
| Sonchak, 2016 <sup>13</sup> | Overall | Overall arm   | 102079     | NR                | NR               | Primiparous: 0.2819<br>Multiparous: NR | NR                            | NR  | GDM: NR<br>HT: NR<br>Pre-pregnancy smoking: NR (19.6) |
| Sonchak, 2017 <sup>14</sup> | Arm 1   | White Non-WIC | 34560      | NR                | NR               | NR                                     | NR                            | Pre-existing DM: NR (1)<br>Prior GDM: NR<br>Prior HT: NR (1)<br>Depression: NR<br>Substance abuse: NR | GDM: NR (4)<br>HT: NR (5)                             |
| Sonchak, 2017 <sup>14</sup> | Arm 2   | White WIC     | 106067     | NR                | NR               | NR                                     | NR                            | Pre-existing DM: NR (1)<br>Prior GDM: NR<br>Prior HT: NR (2)<br>Depression: NR<br>Substance abuse: NR | GDM: NR (5)<br>HT: NR (5)                             |
| Sonchak, 2017 <sup>14</sup> | Arm 3   | Black Non-WIC | 20793      | NR                | NR               | NR                                     | NR                            | Pre-existing DM: NR (1)<br>Prior GDM: NR<br>Prior HT: NR (3)<br>Depression: NR<br>Substance abuse: NR | GDM: NR (4)<br>HT: NR (5)                             |

| Author, Year                | Arm     | Arm Name                                      | Baseline N | Employment, n (%) | Geography, n (%) | Parity, n                              | Pregnancy BMI, n (%) | Maternal Health History, n (%)  | Maternal MorbiditiesMaternal Morbidities, n (%)                           |
|-----------------------------|---------|---|------------|-------------------|------------------|--|----------------------|---|---|
| Sonchak, 2017 <sup>14</sup> | Arm 4   | Black WIC                                     | 109676     | NR                | NR               | NR                                     | NR                   | Pre-existing DM: NR (1)<br>Prior GDM: NR<br>Prior HT: NR (4)<br>Depression: NR<br>Substance abuse: NR           | GDM: NR (5)<br>HT: NR (6)   |
| Sonchak, 2017 <sup>14</sup> | Overall | Overall                                       | 275482     | NR                | NR               | NR                                     | NR                   | Pre-existing DM: NR (1)<br>Prior GDM: NR<br>Prior HT: NR (2)<br>Depression: NR<br>Substance abuse: NR           | GDM: NR (4)<br>HT: NR (5)   |
| Soneji, 2019 <sup>15</sup>  | Arm 1   | Did not receive WIC benefits during pregnancy | 2815304    | NR                | NR               | Primiparous: 850103<br>Multiparous: NR | NR                   | Pre-existing DM: 21600 (0.8)<br>Prior GDM: NR<br>Prior HT: 46100 (1.6)<br>Depression: NR<br>Substance abuse: NR | GDM: 141162 (5)<br>HT: 148067 (5.3)<br>Hypertension eclampsia: 7277 (0.3) |

| Author, Year               | Arm     | Arm Name                               | Baseline N | Employment, n (%) | Geography, n (%) | Parity, n                               | Pregnancy BMI, n (%)   | Maternal Health History, n (%)  | Maternal MorbiditiesMaternal Morbidities, n (%)                              |
|----------------------------|---------|--|------------|-------------------|------------------|---|--|---|--|
| Soneji, 2019 <sup>15</sup> | Arm 2   | Received WIC benefits during pregnancy | 8145770    | NR                | NR               | Primiparous: 2956600<br>Multiparous: NR | NR   | Pre-existing DM: 81046 (1)<br>Prior GDM: NR<br>Prior HT: 139894 (1.7)<br>Depression: NR<br>Substance abuse: NR    | GDM: 452736 (5.6)<br>HT: 425725 (5.2)<br>Hypertension eclampsia: 19508 (0.2) |
| Soneji, 2019 <sup>15</sup> | Overall | All medicaid-insured expectant mothers | 11148261   | NR                | NR               | Primiparous: 3869326<br>Multiparous: NR | NR   | Pre-existing DM: 104503 (0.3)<br>Prior GDM: NR<br>Prior HT: 189437 (1.7)<br>Depression: NR<br>Substance abuse: NR | GDM: 603330 (5.4)<br>HT: 582720 (5.2)<br>Hypertension eclampsia: 27517 (0.2) |
| Testa, 2020 <sup>16</sup>  | Overall | No incarceration                       | 191460     | NR                | NR               | Primiparous: 0.397<br>Multiparous: NR   | NR<br>Underweight: NR (0.037)<br>Normal: NR (0.471)<br>Overweight: NR (0.235)<br>Obese: NR (0.257) | NR  | NR   |

| Author, Year              | Arm     | Arm Name      | Baseline N | Employment, n (%) | Geography, n (%) | Parity, n                            | Pregnancy BMI, n (%)   | Maternal Health History, n (%) | Maternal MorbiditiesMaternal Morbidities, n (%) |
|---------------------------|---------|---------------|------------|-------------------|------------------|--------------------------------------|--|--------------------------------|---|
| Testa, 2020 <sup>16</sup> | Overall | Incarceration | 8759       | NR                | NR               | Primiparous: 0.39<br>Multiparous: NR | NR<br>Underweight: NR (0.058)<br>Normal: NR (0.418)<br>Overweight: NR (0.229)<br>Obese: NR (0.295) | NR                             | NR  |

DM=diabetes mellitus; GDM=gestational diabetes mellitus; HT=hypertension; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-12. Maternal employment, geography, parity, pregnancy, maternal health characteristics of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Arm   | Arm Name                                     | Baseline N                    | Employment, n (%) | Geography, n (%) | Parity, n | Pregnancy BMI, n (%) | Maternal Health History, n (%) | Maternal MorbiditiesMaternal Morbidities, n (%)  |
|----------------------------|-------|--|-------------------------------|-------------------|------------------|-----------|----------------------|--------------------------------|--|
| Hamad, 2019 <sup>18</sup>  | Arm 1 | Infant born before WIC food package revision | No WIC: 716675<br>WIC: 821878 | NR                | NR               | NR        | NR                   | NR                             | GDM: No WIC: 55608 (7.8%)<br>WIC: 61955 (7.6%)<br>HT: NR<br>Pre-eclampsia: No WIC: 21983 (3.1%)<br>WIC: 28393 (3.5%) |
| Hamad, 2019 <sup>18</sup>  | Arm 2 | Infant born after WIC food package revision  | No WIC: 611817<br>WIC: 747167 | NR                | NR               | NR        | NR                   | NR                             | GDM: No WIC: 56505 (9.3%)<br>WIC: 67369 (9.1%)<br>HT: NR<br>Pre-eclampsia: No WIC: 20661 (3.1%)<br>WIC: 28203 (3.8%) |
| Oberle, 2020 <sup>20</sup> | Arm 1 | Before WIC changes                           | 231 (representing 951,481)    | NR                | NR               | NR        | NR                   | NR                             | NR   |
| Oberle, 2020 <sup>20</sup> | Arm 2 | After WIC changes                            | 81 (representing 711,350)     | NR                | NR               | NR        | NR                   | NR                             | NR   |
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC                             | 3004                          | NR                | NR               | NR        | NR                   | NR                             | NR   |
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC                            | 2996                          | NR                | NR               | NR        | NR                   | NR                             | NR   |

DM=diabetes mellitus; GDM=gestational diabetes mellitus; HT=hypertension; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-13. Newborn characteristics of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year                        | Arm   | Arm Name   | Number at Baseline | Sex, n(%)                  | Gestational Age, n(%)  | Birthweight  | Comments  |
|-------------------------------------|-------|--|--------------------|----------------------------|--|--|---|
| Bersak, 2021 <sup>3</sup>           | Arm 1 | Non-WIC  | 49018              | Boy: NR (51)<br>Girl: NR   | 38.2<br>Preterm: NR<br>Early term: NR<br>Late term: NR                         | NR   | None  |
| Bersak, 2021 <sup>3</sup>           | Arm 2 | WIC  | 205132             | Boy: NR (50.9)<br>Girl: NR | 38.4<br>Preterm: NR<br>Early term: NR<br>Late term: NR                         | NR   | None  |
| El-Bastawissi, 2007 <sup>5</sup>    | Arm 1 | Eligible WIC non-participants                    | 10595              | NR                         | NR<br>Preterm: 1221 (11.7)<br>Early term: NR<br>Late term: 9227 (88.3)         | Mean (SD): NR<br>Low weight: 688 (6.6)<br>High weight: NR  | None  |
| El-Bastawissi, 2007 <sup>5</sup>    | Arm 2 | WIC participants                                 | 29013              | NR                         | NR<br>Preterm: 2574 (9)<br>Early term: NR<br>Late term: 26123 (91)             | Mean (SD): NR<br>Low weight: 1395 (4.8)<br>High weight: NR | Extreme preterm 321,3.3%  |
| McCoy, 2018 (study A) <sup>11</sup> | Arm 1 | Not assigned a peer prenatally (reference group) | 345                | Boy: 174 (50)<br>Girl: NR  | Mean: 38.4<br>Preterm: 39 (11)<br>Early term: 110 (32)<br>Late term: 196 (59)  | Mean (SD): 3235 (NR)<br>Low weight: NR<br>High weight: NR  | Gestational age categories read: Preterm (<37 weeks), Near term (37-38 weeks), and Term (39+ weeks) |
| McCoy, 2018 (study A) <sup>11</sup> | Arm 2 | Assigned a peer, but no prenatal services        | 733                | Boy: 376 (51)<br>Girl: NR  | Mean: 38.7<br>Preterm: 65 (9)<br>Early term: 207 (28)<br>Late term: 461 (63)   | Mean (SD): 3327 (NR)<br>Low weight: NR<br>High weight: NR  | Gestational age categories read: Preterm (<37 weeks), Near term (37-38 weeks), and Term (39+ weeks) |
| McCoy, 2018 (study A) <sup>11</sup> | Arm 3 | Assigned a peer and received prenatal services   | 1141               | Boy: 570 (50)<br>Girl: NR  | Mean: 38.5<br>Preterm: 118 (10)<br>Early term: 340 (30)<br>Late term: 683 (60) | Mean (SD): 3346 (NR)<br>Low weight: NR<br>High weight: NR  | Gestational age categories read: Preterm (<37 weeks), Near term (37-38 weeks), and Term (39+ weeks) |

| Author, Year                        | Arm   | Arm Name  | Number at Baseline | Sex, n(%)                 | Gestational Age, n(%)  | Birthweight   | Comments   |
|-------------------------------------|-------|---|--------------------|---------------------------|--|---|--|
| McCoy, 2018 (study B) <sup>11</sup> | Arm 1 | Did not receive peer services at any time point | 558                | Boy: 286 (51)<br>Girl: NR | Mean: 38.4<br>Preterm: 45 (8)<br>Early term: 171 (31)<br>Late term: 131 (23)   | Mean (SD): 3325 (NR)<br>Low weight: NR<br>High weight: NR | Gestational age categories read: Preterm (<37 weeks), Near term (37-38 weeks), and Term (39+ weeks)  |
| McCoy, 2018 (study B) <sup>11</sup> | Arm 2 | Received peer services                          | 1342               | Boy: 682 (51)<br>Girl: NR | Mean: 38.7<br>Preterm: 153 (11)<br>Early term: 409 (31)<br>Late term: 397 (30) | Mean (SD): 3327 (NR)<br>Low weight: NR<br>High weight: NR | Gestational age categories read: Preterm (<37 weeks), Near term (37-38 weeks), and Term (39+ weeks)  |
| Soneji, 2019 <sup>15</sup>          | Arm 1 | Did not receive WIC benefits during pregnancy   | NR                 | NR                        | NR<br>Preterm: 397828 (0.04)<br>Early term: NR<br>Late term: NR                | NR  | Gestational age category reported as: Arm 1: Extremely preterm: 34800 (1.2%); Very preterm: 46873 (1.7%); Moderate-to-late preterm: 316155 (11.2%); Normal term: 2413521 (85.7%); Unknown or missing data on gestational age category: 3955 (0.1%)       |
| Soneji, 2019 <sup>15</sup>          | Arm 1 | Did not receive WIC benefits during pregnancy   | NR                 | NR                        | NR   | NR  | None   |
| Soneji, 2019 <sup>15</sup>          | Arm 2 | Received WIC benefits during pregnancy          | NR                 | NR                        | NR<br>Preterm: 1015082 (0.09)<br>Early term: NR<br>Late term: NR               | NR  | Gestational age category reported as: Arm 2: Extremely preterm: 56558 (0.7%); Very preterm: 105448 (1.3%); Moderate-to-late preterm: 853076 (10.5%); Normal term: 7126798 (87.5%); Unknown or missing data on gestational age category: 3890 (% missing) |

| Author, Year               | Arm     | Arm Name                               | Number at Baseline | Sex, n(%) | Gestational Age, n(%)  | Birthweight  | Comments   |
|----------------------------|---------|--|--------------------|-----------|--|--|--|
| Soneji, 2019 <sup>15</sup> | Arm 2   | Received WIC benefits during pregnancy | NR                 | NR        | NR   | NR   | None   |
| Soneji, 2019 <sup>15</sup> | Overall | All medicaid-insured expectant mothers | NR                 | NR        | NR<br>Preterm: 2971082 (0.27)<br>Early term: NR<br>Late term: NR | NR   | Gestational age category reported as: Overall: Extremely preterm: 94979 (0.9%); Very preterm: 155685 (1.4%); Moderate-to-late preterm: 1190100 (10.7%); Normal term: 9698970 (87%); Unknown or missing data on gestational age category: 8527 (0.1%) |
| Soneji, 2019 <sup>15</sup> | Overall | All publicly insured mothers           | NR                 | NR        | NR   | NR   | None   |
| Testa, 2020 <sup>16</sup>  | Overall | No incarceration                       | 191460             | NR        | NR<br>Preterm: NR (8.3)<br>Early term: NR<br>Late term: NR       | Mean (SD): NR<br>Low weight: NR (6.7)<br>High weight: NR | Very low birth weight; 1.1%  |
| Testa, 2020 <sup>16</sup>  | Overall | Incarceration                          | 8759               | NR        | NR<br>Preterm: NR (11.3)<br>Early term: NR<br>Late term: NR      | Mean (SD): NR<br>Low weight: NR (9.9)<br>High weight: NR | Verry low birth weight ; 1.7%  |

NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-14. Newborn characteristics of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Arm   | Arm Name                        | Number at Baseline            | Sex, n(%)  | Gestational Age, n(%)   | Birthweight  |
|---------------------------|-------|---------------------------------|-------------------------------|--|---|--|
| Hamad, 2019 <sup>18</sup> | Arm 1 | Infant born before WIC revision | No WIC: 716675<br>WIC: 821878 | Boy: No WIC: 368263<br>WIC: 420471 (No WIC: 51.4<br>WIC: 51.2)<br>Girl: NR | No WIC: Mean 38.7 (SD 1.9)<br>WIC: Mean 38.7 (SD 1.8)<br>Preterm: No WIC: 51291<br>WIC: 59,190 (No WIC: 7.2%<br>WIC: 7.2%)<br>Early term: NR<br>Late term: NR | Mean (SD): No WIC, z-score: 0.06 (SD 0.9)<br>WIC, z-score: 0.006 (SD 0.95)<br>Low weight: No WIC: 35586 (SD 5.0)<br>WIC: 41875 (SD 5.1)<br>High weight: NR |
| Hamad, 2019 <sup>18</sup> | Arm 2 | Infant born after WIC revision  | No WIC: 611817<br>WIC: 747167 | Boy: No WIC: 314794<br>WIC: 381270 (No WIC: 51.5<br>WIC: 51.0)<br>Girl: NR | No WIC: Mean 38.8 (SD 1.8)<br>WIC: Mean 38.7 (SD 1.8)<br>Preterm: No WIC: 41168<br>WIC: 51374 (No WIC: 6.7%<br>WIC: 6.9%)<br>Early term: NR<br>Late term: NR  | Mean (SD): No WIC, z-score: 0.04 (SD 0.9)<br>WIC, z-score: -0.01 (SD 1.0)<br>Low weight: No WIC: 30067 (SD 4.9)<br>WIC: 38493 (SD 5.2)<br>High weight: NR  |

NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-15. Characteristics of mother or caregiver of infant and child in studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year                 | Arm     | Arm Name                          | Number at Baseline                     | Age of Mother, n(%)  | Race/Ethnicity of Mother, n(%) | Education   | Employment | Housing | Caregiver BMI |
|------------------------------|---------|-----------------------------------|--|--|--------------------------------|---|------------|---------|---------------|
| Bolbocean, 2021 <sup>4</sup> | Arm 1   | Receiving WIC at age 1, not age 2 | NR                                     | NR   | NR                             | NR  | NR         | NR      | NR            |
| Bolbocean, 2021 <sup>4</sup> | Arm 2   | Receiving WIC at age 1 and 2      | NR                                     | NR   | NR                             | NR  | NR         | NR      | NR            |
| Bolbocean, 2021 <sup>4</sup> | Overall | Overall                           | Range in analyses: 1525-1694           | NR   | NR                             | NR  | NR         | NR      | NR            |
| Gleason, 2020 <sup>7</sup>   | Overall | WIC Participants                  | unweighted n=1,235; weighted n=319,083 | Age at delivery<br>16-19: NR (weighted %=17%)<br>20-25: NR (weighted %=38.2)<br>≥26: NR (weighted %=49.7%) | NR                             | Less than HS: NR<br>Less than or equal to HS: NR (weighted %=59.5)<br>HS/GED: NR<br>More than HS: NR (weighted %=40.5)<br>College: NR | NR         | NR      | NR            |
| Rhee, 2019 <sup>12</sup>     | Overall | Overall                           | 3366                                   | NR   | NR                             | NR  | NR         | NR      | NR            |
| Zhang, 2021 <sup>17</sup>    | Overall | WIC Eligible Children             | 92,335                                 | Not specified<br>< 30 years: (54.1%)<br>≥ 30 years: (45.9)<br>: (%)  | NR                             | Less than HS: NR (28)<br>Less than or equal to HS: NR<br>HS/GED: NR (38)<br>More than HS: NR (23.4)<br>College: NR (10.6)             | NR         | NR      | NR            |

| Author, Year              | Arm   | Arm Name                                | Number at Baseline | Age of Mother, n(%)  | Race/Ethnicity of Mother, n(%) | Education  | Employment | Housing | Caregiver BMI |
|---------------------------|-------|---|--------------------|--|--------------------------------|--|------------|---------|---------------|
| Zhang, 2021 <sup>17</sup> | Arm 1 | WIC Eligible Participating Children     | 71,757             | Not specified<br><30 years:<br>(57.2%)<br>≥ 30 years:<br>(42.8)<br>: (%) | NR                             | Less than HS: NR (31.1)<br>Less than or equal to HS: NR<br>HS/GED: NR (39.3)<br>More than HS: NR (22.7)<br>College: NR (6.9) | NR         | NR      | NR            |
| Zhang, 2021 <sup>17</sup> | Arm 2 | WIC Eligible Non-Participating Children | 20,578             | <30 years:<br>(39.2%)<br>≥ 30 years:<br>(60.8)<br>: (%)                  | NR                             | Less than HS: NR (13)<br>Less than or equal to HS: NR<br>HS/GED: NR (31.1)<br>More than HS: NR (27.1)<br>College: NR (28.8)  | NR         | NR      | NR            |

GED=General Education Development; HS=high school; n=sample size; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-16. Characteristics of mother or caregiver of infant and child in studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year             | Arm   | Arm Name         | Number at Baseline | Age of Mother, n(%)                       | Race/Ethnicity of Mother, n(%)                       | Education  | Employment                                | Housing | Caregiver BMI   |
|--------------------------|-------|------------------|--------------------|---|--|--|---|---------|---|
| Kong, 2014 <sup>19</sup> | Arm 1 | Hispanic         | 112                | Not specified<br>Mean (SD):<br>31.4 (5.6) | NR<br><br>Non-Hispanic:<br>112 (100)<br>Hispanic: NR | Less than<br>HS: NR<br>Less than<br>or equal to<br>HS: NR<br>HS/GED:<br>56 (50)<br>More than<br>HS: NR<br>College:<br>NR | Employed: 13<br>(12)<br>Unemployed:<br>NR | NR      | Mean (SD):<br>31 (6.9)<br>Overweight:<br>42 (39)<br>Obese: 49<br>(45)   |
| Kong, 2014 <sup>19</sup> | Arm 2 | African American | 97                 | Not specified<br>Mean (SD):<br>32.2 (9.8) | Black or African American: 97<br>(100)<br><br>NR     | Less than<br>HS: NR<br>Less than<br>or equal to<br>HS: NR<br>HS/GED:<br>77 (79)<br>More than<br>HS: NR<br>College:<br>NR | Employed: 14<br>(15)<br>Unemployed:<br>NR | NR      | Mean (SD):<br>30.8 (7.1)<br>Overweight:<br>26 (31)<br>Obese: 41<br>(49) |

GED=General Education Development; HS=high school; n=sample size; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-17. Infant and child characteristics of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year                 | Arm     | Arm Name         | Number at Baseline                     | Sex, n(%)                             | Age of Children | Race/Ethnicity   | Age at WIC Certification | Mother Participation in WIC                 | Geographic Location | Other Baseline Characteristics |
|------------------------------|---------|------------------|--|---------------------------------------|-----------------|--|--------------------------|---|---------------------|--------------------------------|
| Bolbocean, 2021 <sup>4</sup> | NR      | NR               | NR                                     | NR                                    | NR              | NR   | NR                       | NR  | NR                  | NR                             |
| Bolbocean, 2021 <sup>4</sup> | NR      | NR               | NR                                     | NR                                    | NR              | NR   | NR                       | NR  | NR                  | NR                             |
| Bolbocean, 2021 <sup>4</sup> | NR      | NR               | NR                                     | NR                                    | NR              | NR   | NR                       | NR  | NR                  | NR                             |
| Gleason, 2020 <sup>7</sup>   | Overall | WIC participants | unweighted n=1,235; weighted n=319,083 | NR                                    | NR              | Non-Hispanic-Black or African American: NR (weighted %=17.4)<br>Non-Hispanic-White: NR (weighted%=23.5)<br>Other: Non-hispanic Other, NR (weighted %= 6.8)<br><br>Non-Hispanic: NR (weighted %=52.3)<br>Hispanic: NR | NR                       | NR  | NR                  | NR                             |
| Perkins, 2020 <sup>42</sup>  | Overall | Overall          | NR                                     | NR                                    | NR              | NR   | NR                       | Yes, unweighted n=1,235; weighted n=319,083 | NR                  | NR                             |
| Rhee, 2019 <sup>12</sup>     | Overall | Overall          | 3366                                   | Boy: 1799 (53.4)<br>Girl: 1567 (46.6) | NR              | NR   | NR                       | NR  | NR                  | NR                             |

| Author, Year              | Arm     | Arm Name                                | Number at Baseline | Sex, n(%)                   | Age of Children                                       | Race/Ethnicity   | Age at WIC Certification | Mother Participation in WIC | Geographic Location | Other Baseline Characteristics  |
|---------------------------|---------|---|--------------------|-----------------------------|---|--|--------------------------|-----------------------------|---------------------|---|
| Zhang, 2021 <sup>17</sup> | Overall | WIC Eligible Children                   | 92,335             | Boy: (51)<br>Girl: (49)     | NR<br>19-23: (28.5)<br>24-29: (37.1)<br>30-35: (34.4) | Non-Hispanic-White: (35.9)<br>Non-Hispanic-Black or African American: (17.3)<br><br>Other: (9.9)<br><br>Non-Hispanic: (36.9)<br>Hispanic | NR                       | NR                          | NR                  | Interview language, maternal marital status and number of household members |
| Zhang, 2021 <sup>17</sup> | Arm 1   | WIC Eligible Participating Children     | 71,757             | Boy: (50.9)<br>Girl: (49.1) | NR<br>19-23: (28.6)<br>24-29: (37.2)<br>30-35: (34.2) | Non-Hispanic-White: (31.1)<br>Non-Hispanic-Black or African American: (19)<br><br>Other: (9.6)<br><br>Non-Hispanic: (40.3)<br>Hispanic   | NR                       | NR                          | NR                  | Interview language, maternal marital status and number of household members |
| Zhang, 2021 <sup>17</sup> | Arm 2   | WIC Eligible Non-Participating Children | 20,578             | Boy: (51.2)<br>Girl: (48.8) | NR<br>19-23: (28.3)<br>24-29: (36.4)<br>30-35: (35.3) | Non-Hispanic-White: (59.6)<br>Non-Hispanic-Black or African American: (8.8)<br><br>Other: (11.3)<br><br>Non-Hispanic: (20.3)<br>Hispanic | NR                       | NR                          | NR                  | Interview language, maternal marital status and number of household members |

BMI=Body Mass Index; F&V=fruits and vegetables; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-18. Infant and child characteristics of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year             | Arm   | Arm Name         | Number at Baseline | Sex, n(%)                | Age of Children                           | Race/Ethnicity | Age at WIC Certification | Mother Participation in WIC | Geographic Location | Other Baseline Characteristics   |
|--------------------------|-------|------------------|--------------------|--------------------------|---|----------------|--------------------------|-----------------------------|---------------------|--|
| Kong, 2014 <sup>19</sup> | Arm 1 | Hispanic         | 112                | Boy: NR<br>Girl: 50 (53) | Mean (SD): 52 months (5.8 months)<br>NR   | NR             | NR                       | NR                          | NR                  | Married/living with partner: 90 (80%); acculturation score < 3: 89 (79%); interviewed in spanish: 87 (78%); 1-2 children in household: 54 (48); > 2 children in household: 58 (52%); # adults in household = 1: 11 (10%); # adults in household ≥2: 101 (90%); F&V voucher =\$6: 57 (51%); F&V voucher >\$6: 55 (49%); SNAP or other cash assistance in last 6 months: 90 (80%); CHILD: BMI /= 85th percentile: 47 (53%) |
| Kong, 2014 <sup>19</sup> | Arm 2 | African American | 97                 | Boy: NR<br>Girl: 37 (53) | Mean (SD): 52.8 months (5.3 months)<br>NR | NR             | NR                       | NR                          | NR                  | Married/living with partner: 21 (22%); 1-2 children in household: 52 (54); > 2 children in household: 45 (46%); # adults in  |

| Author, Year | Arm | Arm Name | Number at Baseline | Sex, n(%) | Age of Children | Race/Ethnicity | Age at WIC Certification | Mother Participation in WIC | Geographic Location | Other Baseline Characteristics   |
|--------------|-----|----------|--------------------|-----------|-----------------|----------------|--------------------------|-----------------------------|---------------------|--|
|              |     |          |                    |           |                 |                |                          |                             |                     | household = 1: 37 (38%); # adults in household ≥2: 60 (62%); F&V voucher =\$6: 50 (52%); F&V voucher >\$6: 47 (48%); SNAP or other cash assistance in last 6 months: 90 (93%); CHILD: BMI /= 85th percentile: 19 (30%) |

BMI=Body Mass Index; F&V=fruits and vegetables; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-19. Household characteristics of studies investigating the Key Question 1 and Key Question 2 association between maternal, infant birth, and child outcomes, and WIC participation compared with eligible non-participants**

| Author, Year                  | Arm   | Arm Name                            | Number at Baseline | Number of Household, n | People in Household | WIC Participants | Household Income                 | Geography | Race/Ethnicity   |
|-------------------------------|-------|-------------------------------------|--------------------|------------------------|---------------------|------------------|----------------------------------|-----------|--|
| Andreyeva, 2016 <sup>22</sup> | Arm 1 | Pre-revision, comparison household  | 1303               | 1303                   | NR                  | NR               | Mean household income, \$: 57918 | NR        | NR<br>Non-Hispanic-White: NR (82)<br>Non-Hispanic-Black or African American: NR (4)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR |
| Andreyeva, 2016 <sup>22</sup> | Arm 2 | Post-revision, comparison household | 1303               | 1303                   | NR                  | NR               | Mean household income, \$: 57941 | NR        | NR<br>Non-Hispanic-White: NR (82)<br>Non-Hispanic-Black or African American: NR (4)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR |
| Andreyeva, 2016 <sup>22</sup> | Arm 3 | Pre-revision, WIC household         | 2137               | 2137                   | NR                  | NR               | Mean household income, \$: 56042 | NR        | NR<br>Non-Hispanic-White: NR (83)<br>Non-Hispanic-Black or African American: NR (4)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR |

| Author, Year                  | Arm     | Arm Name                     | Number at Baseline | Number of Household, n | People in Household  | WIC Participants  | Household Income                               | Geography   | Race/Ethnicity   |
|-------------------------------|---------|------------------------------|--------------------|------------------------|--|---|--|---|--|
| Andreyeva, 2016 <sup>22</sup> | Arm 4   | Post-revision, WIC household | 2137               | 2137                   | NR   | NR  | Mean household income, \$: 55952               | NR  | NR<br>Non-Hispanic-White: NR (83)<br>Non-Hispanic-Black or African American: NR (4)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR                       |
| Bolbocean, 2021 <sup>4</sup>  | Overall | Overall                      | NR                 | NR                     | Number of people: NR<br>Number of people: NR<br>Mean NR<br>Number of children <5yrs: NR<br>Number of children: NR<br>Mean NR | NR  | NR   | NR  | NR   |
| Fang, 2019 <sup>28</sup>      | Arm 1   | Eligible Non-participants    | 505                | 505                    | NR   | Women only: 0.158 (SD 0.365)<br>Pregnant women: NR<br>Children only: 0.853 (SD 0.569)<br>Women and children: NR | Monthly income (\$1000): Mean 5.144 (SD 6.392) | Urban: NR<br>Rural: NR<br>Suburban: NR<br>Mixed: 0.236 (SD 0.425) | Respondent Black or African American: Proportion of household: 0.156 (SD 0.346)<br><br>Non-Hispanic: Proportion of household: 0.247 (SD 0.405)<br>Hispanic: NR |

| Author, Year               | Arm   | Arm Name                            | Number at Baseline | Number of Household, n | People in Household   | WIC Participants  | Household Income                                 | Geography   | Race/Ethnicity  |
|----------------------------|-------|-------------------------------------|--------------------|------------------------|---|---|--|---|---|
| Fang, 2019 <sup>28</sup>   | Arm 2 | Did not redeem WIC                  | 271                | 271                    | NR  | Women only: 0.303 (SD 0.460)<br>Pregnant women: NR<br>Children only: 0.708 (SD 0.672)<br>Women and children: NR | Monthly income (\$1000): Mean 2.702 (SD 1.966)   | Urban: NR<br>Rural: NR<br>Suburban: NR<br>Mixed: 0.221 (SD 0.416) | Respondent Black or African American: Proportion of household: 0.205 (SD 0.386)<br><br>Non-Hispanic: Proportion of household: 0.415 (SD 0.472)<br>Hispanic: NR  |
| Fang, 2019 <sup>28</sup>   | Arm 3 | Redeemed WIC                        | 152                | 152                    | NR  | Women only: 0.283 (SD 0.452)<br>Pregnant women: NR<br>Children only: 0.822 (SD 0.790)<br>Women and children: NR | Monthly income (\$1000): Mean 3.071 (SD 4.011)   | Urban: NR<br>Rural: NR<br>Suburban: NR<br>Mixed: 0.257 (SD 0.438) | Respondent Black or African American: Proportion of household: 0.112 (SD 0.300)<br><br>Non-Hispanic: Proportion of household: 0.351 (SD 0.464)<br>Hispanic: NR  |
| Litvak, 2020 <sup>38</sup> | Arm 1 | Income ineligible for WIC household | 926                | 926                    | Number of people: Median: 3 (IQR 3 to 4)<br>Number of children <5yrs: 218 | Women only: 730 (79)<br>Pregnant women: 23 (3)<br>Children only: NR<br>Women and children: NR                   | High household 30-day food insecurity: 640 (69%) | Urban: NR<br>Rural: NR<br>Suburban: 230 (25)<br>Mixed: NR         | Respondent Non-Hispanic-White: 604 (66)<br>Non-Hispanic-Black or African American: 59 (6)<br>Other: 94 (10)<br><br>Non-Hispanic: 172 (19)<br>Hispanic: 754 (81) |



| Author, Year               | Arm   | Arm Name           | Number at Baseline | Number of Household, n | People in Household  | WIC Participants   | Household Income                                 | Geography   | Race/Ethnicity  |
|----------------------------|-------|--------------------|--------------------|------------------------|--|--|--|---|---|
| Litvak, 2020 <sup>38</sup> | Arm 2 | WIC household      | 143                | 143                    | Mean:<br>Median: 5 (IQR 4 to 6)<br>Number of children <5yrs: 131 | Women only: 121 (85)<br>Pregnant women: 34 (24)<br>Children only: 16 (9)<br>Women and children: 58 (32)  | High household 30-day food insecurity: 40 (57%)  | Urban: NR<br>Rural: NR<br>Suburban: 35 (25)<br>Mixed: NR  | Respondent<br>Non-Hispanic-White: 62 (43)<br>Non-Hispanic-Black or African American: 15 (11)<br>Other: 9 (6)<br><br>Non-Hispanic: 57 (40)<br>Hispanic: 86 (60)      |
| Litvak, 2020 <sup>38</sup> | Arm 3 | WIC+SNAP household | 246                | 246                    | Mean:<br>Median: 4 (IQR 4 to 5)<br>Number of children <5yrs: 226 | Women only: 224 (91)<br>Pregnant women: 45 (18)<br>Children only: 31 (30)<br>Women and children: 44 (43) | High household 30-day food insecurity: 34 (83%)  | Urban: NR<br>Rural: NR<br>Suburban: 60 (24)<br>Mixed: NR  | Respondent<br>Non-Hispanic-White: 107 (44)<br>Non-Hispanic-Black or African American: 38 (16)<br>Other: 11 (5)<br><br>Non-Hispanic: 90 (37)<br>Hispanic: 156 (63)   |
| Litvak, 2020 <sup>38</sup> | Arm 4 | SNAP household     | 689                | 689                    | Mean:<br>Median: 4 (IQR 3 to 5)<br>Number of children <5yrs: 151 | Women only: 591 (86)<br>Pregnant women: 13 (1)<br>Children only: NR<br>Women and children: NR            | High household 30-day food insecurity: 207 (30%) | Urban: NR<br>Rural: NR<br>Suburban: 176 (26)<br>Mixed: NR | Respondent<br>Non-Hispanic-White: 327 (48)<br>Non-Hispanic-Black or African American: 135 (20)<br>Other: 43 (6)<br><br>Non-Hispanic: 184 (27)<br>Hispanic: 505 (73) |

| Author, Year               | Arm   | Arm Name                          | Number at Baseline | Number of Household, n | People in Household   | WIC Participants   | Household Income                                 | Geography   | Race/Ethnicity  |
|----------------------------|-------|-----------------------------------|--------------------|------------------------|---|--|--|---|---|
| Litvak, 2020 <sup>38</sup> | Arm 5 | Income eligible for WIC household | 432                | 432                    | Mean:<br>Median: 3 (IQR 2 to 5)<br>Number of children <5yrs: 86 | Women only: 349 (81)<br>Pregnant women: 6 (1)<br>Children only: NR<br>Women and children: NR | High household 30-day food insecurity: 152 (35%) | Urban: NR<br>Rural: NR<br>Suburban: 101 (23)<br>Mixed: NR | Respondent<br>Non-Hispanic-White: 205 (48)<br>Non-Hispanic-Black or African American: 127 (30)<br>Other: 40 (9)<br><br>Non-Hispanic: 127 (30)<br>Hispanic: 305 (70)                           |
| Ng, 2018 <sup>39</sup>     | Arm 1 | Non-WIC participation             | 2478               | 2478                   | NR  | NR   | NR   | NR  | Respondent<br>Non-Hispanic-White: NR (64.56-65.92)<br>Non-Hispanic-Black or African American: NR (11.69-13.65)<br>Other: NR (4.73-6.14)<br><br>Non-Hispanic: NR (14.83-19.02)<br>Hispanic: NR |
| Ng, 2018 <sup>39</sup>     | Arm 2 | WIC participation                 | 2155               | 2155                   | NR  | NR   | NR   | NR  | Respondent<br>Non-Hispanic-White: NR (57.1-67.28)<br>Non-Hispanic-Black or African American: NR (10.54-13.11)<br>Other: NR (2.6-6.53)<br><br>Non-Hispanic: NR (16.8-24.46)<br>Hispanic: NR    |

| Author, Year                | Arm     | Arm Name                     | Number at Baseline | Number of Household, n | People in Household                     | WIC Participants  | Household Income   | Geography | Race/Ethnicity  |
|-----------------------------|---------|------------------------------|--------------------|------------------------|---|---|--|-----------|---|
| Oh, 2016 <sup>40</sup>      | Overall | Overall                      | 3199               | 3199                   | Number of people: Mean 3.7 (1.67)       | NR  | Mean \$29953.56 (SD \$17428.56)                                  | NR        | NR<br>Black or African American: Binary value (=1 if met) 0.16 (SD 0.365)<br><br>Non-Hispanic: Binary value (=1 if met) 0.14 (SD 0.344)<br>Hispanic: NR |
| Rhee, 2019 <sup>12</sup>    | Overall | Overall                      | 3366               | 3366                   | NR                                      | Women only: NR<br>Pregnant women: 3366 (100)<br>Children only: NR<br>Women and children: NR | Block group-level median household income: \$43333 (IQR \$30253) | NR        | NR  |
| Stewart, 2019 <sup>44</sup> | Arm 1   | Eligible, non-WIC households | 266                | 266                    | Number of people: Mean 4.522 (SE 0.151) | NR  | Income (%FPL): Mean 108.2 (SE 5.885)<br>Income <185% FPL: 1      | NR        | NR  |
| Stewart, 2019 <sup>44</sup> | Arm 2   | WIC households               | 471                | 471                    | Number of people: Mean 4.609 (SE 0.122) | Women only: NR<br>Pregnant women: NR (28.8)<br>Children only: NR<br>Women and children: NR  | Income (%FPL): Mean 169.3 (SE 8.304)<br>Income <185% FPL: 1      | NR        | NR  |

| Author, Year                | Arm     | Arm Name                            | Number at Baseline | Number of Household, n | People in Household  | WIC Participants | Household Income  | Geography | Race/Ethnicity   |
|-----------------------------|---------|-------------------------------------|--------------------|------------------------|--|------------------|---|-----------|--|
| Stewart, 2019 <sup>44</sup> | Overall | Overall                             | 4826               | 4826                   | Number of people: Mean 2.442 (SD 0.045)  | NR               | Income (%FPL): Mean 381.7 (SE 16.61)<br>Income <185% FPL: 1 | NR        | Participant<br>Non-Hispanic-Black or African American: NR (18.3)<br>Non-Hispanic-White: NR (63)<br><br>Non-Hispanic: NR (39.9)<br>Hispanic: NR |
| Zhang, 2021 <sup>17</sup>   | Overall | WIC Eligible Children               | 92,335             | NR                     | Number of people: NR<br>Number of people: Mean 4.7 (0.011(SE))<br>Number of children <5yrs: NR<br>Number of children: Mean NR  | NR               | NR  | NR        | NR   |
| Zhang, 2021 <sup>17</sup>   | Arm 1   | WIC Eligible Participating Children | 71,757             | NR                     | Number of people: NR<br>Number of people: Mean 4.7 (0.011 (SE))<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | NR  | NR        | NR   |

| Author, Year              | Arm   | Arm Name                                | Number at Baseline | Number of Household, n | People in Household  | WIC Participants | Household Income | Geography | Race/Ethnicity |
|---------------------------|-------|---|--------------------|------------------------|--|------------------|------------------|-----------|----------------|
| Zhang, 2021 <sup>17</sup> | Arm 2 | WIC Eligible Non-Participating Children | 20,578             | NR                     | Number of people: NR<br>Number of people: Mean 4.8 (0.021 (SE))<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | NR               | NR        | NR             |

IQR=interquartile range; NR=not reported; SD=standard deviation; SNAP= Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-20. Household characteristics of studies investigating the Key Question 1 and Key Question 2 association of the 2009 food package change with maternal, infant birth, and child outcomes**

| Author, Year                  | Arm   | Arm Name                         | Number at Baseline | Number of Household, n | People in Household | WIC Participants | Household Income                           | Geography | Race/Ethnicity   |
|-------------------------------|-------|----------------------------------|--------------------|------------------------|---------------------|------------------|--|-----------|--|
| Andreyeva, 2013 <sup>53</sup> | Arm 1 | Pre-WIC revision, WIC household  | 2137               | 2137                   | NR                  | NR               | Mean household income, in US\$ 10,000: 5.6 | NR        | NR<br>Non-Hispanic-White: NR (83.5)<br>Non-Hispanic-Black or African American: NR (3.8)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR |
| Andreyeva, 2013 <sup>53</sup> | Arm 2 | Post-WIC revision, WIC household | 2137               | 2137                   | NR                  | NR               | Mean household income, in US\$ 10,000: 5.6 | NR        | NR<br>Non-Hispanic-White: NR (83.5)<br>Non-Hispanic-Black or African American: NR (3.7)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR |
| Andreyeva, 2013 <sup>54</sup> | Arm 1 | Pre-WIC revision, WIC household  | 2137               | 2137                   | NR                  | NR               | Mean household income, in US\$ 10,000: 5.6 | NR        | NR<br>Non-Hispanic-White: NR (83.5)<br>Non-Hispanic-Black or African American: NR (3.8)<br><br>Non-Hispanic: NR<br>Hispanic: NR              |
| Andreyeva, 2013 <sup>54</sup> | Arm 2 | Post-WIC revision, WIC household | 2137               | 2137                   | NR                  | NR               | Mean household income, in US\$ 10,000: 5.6 | NR        | NR<br>Non-Hispanic-White: NR (83.5)<br>Non-Hispanic-Black or African American: NR (3.7)<br><br>Non-Hispanic: NR<br>Hispanic: NR              |

| Author, Year                  | Arm   | Arm Name                         | Number at Baseline | Number of Household, n | People in Household | WIC Participants | Household Income                           | Geography | Race/Ethnicity   |
|-------------------------------|-------|----------------------------------|--------------------|------------------------|---------------------|------------------|--|-----------|--|
| Andreyeva, 2014 <sup>55</sup> | Arm 1 | Pre-WIC revision, WIC household  | 515                | 515                    | NR                  | NR               | Mean household income, in US\$ 10,000: 6.5 | NR        | NR<br>Non-Hispanic-White: NR (83.8)<br>Non-Hispanic-Black or African American: NR (3.5)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR |
| Andreyeva, 2014 <sup>55</sup> | Arm 2 | Post-WIC revision, WIC household | 515                | 515                    | NR                  | NR               | Mean household income, in US\$ 10,000: 6.5 | NR        | NR<br>Non-Hispanic-White: NR (84)<br>Non-Hispanic-Black or African American: NR (3.3)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR   |
| Andreyeva, 2015 <sup>56</sup> | Arm 1 | Pre-WIC revision, WIC household  | 2137               | 2137                   | NR                  | NR               | Mean household income, in US\$ 10,000: 5.6 | NR        | NR<br>Non-Hispanic-White: NR (83.5)<br>Non-Hispanic-Black or African American: NR (3.8)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR |
| Andreyeva, 2015 <sup>56</sup> | Arm 2 | Post-WIC revision, WIC household | 2137               | 2137                   | NR                  | NR               | Mean household income, in US\$ 10,000: 5.6 | NR        | NR<br>Non-Hispanic-White: NR (83.5)<br>Non-Hispanic-Black or African American: NR (3.7)<br>Other: NR<br><br>Non-Hispanic: NR<br>Hispanic: NR |

| Author, Year                 | Arm   | Arm Name                                       | Number at Baseline | Number of Household, n | People in Household   | WIC Participants | Household Income      | Geography | Race/Ethnicity |
|------------------------------|-------|--|--------------------|------------------------|---|------------------|-----------------------|-----------|----------------|
| Chaparro, 2020 <sup>61</sup> | Arm 1 | Very low income (<50% FPL), boys, old package  | 5433               | NR                     | Number of people: NR<br>Mean: 3.96<br>(95% CI: 1.63)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | <50% FPL: 100 percent | NR        | NR             |
| Chaparro, 2020 <sup>61</sup> | Arm 2 | Very low income (<50% FPL), boys, new package  | 5433               | NR                     | Number of people: NR<br>Mean: 4.07<br>(95% CI: 1.6)<br>Number of children <5yrs: NR<br>Number of children: Mean NR  | NR               | <50% FPL: 100 percent | NR        | NR             |
| Chaparro, 2020 <sup>61</sup> | Arm 3 | Very low income (<50% FPL), girls, old package | 5294               | NR                     | Number of people: NR<br>Mean: 3.98<br>(95% CI: 1.66)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | <50% FPL: 100 percent | NR        | NR             |



| Author, Year                 | Arm   | Arm Name                                       | Number at Baseline | Number of Household, n | People in Household  | WIC Participants | Household Income         | Geography | Race/Ethnicity |
|------------------------------|-------|--|--------------------|------------------------|--|------------------|--------------------------|-----------|----------------|
| Chaparro, 2020 <sup>61</sup> | Arm 4 | Very low income (<50% FPL), girls, new package | 5294               | NR                     | Number of people: NR<br>Mean: 4.09 (95% CI: 1.68)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | <50% FPL: 100 percent    | NR        | NR             |
| Chaparro, 2020 <sup>61</sup> | Arm 5 | Low income (50-100% FPL), boys, old package    | 10520              | NR                     | Number of people: NR<br>Mean: 4.19 (95% CI: 1.24)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | 50-100% FPL: 100 percent | NR        | NR             |
| Chaparro, 2020 <sup>61</sup> | Arm 6 | Low income (50-100% FPL), boys, new package    | 10520              | NR                     | Number of people: NR<br>Mean: 4.2 (95% CI: 1.21)<br>Number of children <5yrs: NR<br>Number of children: Mean NR  | NR               | 50-100% FPL: 100 percent | NR        | NR             |

| Author, Year                 | Arm   | Arm Name  | Number at Baseline | Number of Household, n | People in Household   | WIC Participants | Household Income                | Geography | Race/Ethnicity |
|------------------------------|-------|---|--------------------|------------------------|---|------------------|---------------------------------|-----------|----------------|
| Chaparro, 2020 <sup>61</sup> | Arm 7 | Low income (50-100% FPL), girls, old package          | 10206              | NR                     | Number of people: NR<br>Mean: 4.19<br>(95% CI: 1.25)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | 50-100% FPL: 100 percent        | NR        | NR             |
| Chaparro, 2020 <sup>61</sup> | Arm 8 | Low income (50-100% FPL), girls, new package          | 10206              | NR                     | Number of people: NR<br>Mean: 4.21<br>(95% CI: 1.22)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | 50-100% FPL: 100 percent        | NR        | NR             |
| Chaparro, 2020 <sup>61</sup> | Arm 9 | Above poverty (>100% to <185% FPL), boys, old package | 4177               | NR                     | Number of people: NR<br>Mean: 3.92<br>(95% CI: 1.16)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | >100% to <185% FPL: 100 percent | NR        | NR             |

| Author, Year                 | Arm    | Arm Name   | Number at Baseline | Number of Household, n | People in Household  | WIC Participants | Household Income                | Geography | Race/Ethnicity |
|------------------------------|--------|--|--------------------|------------------------|--|------------------|---------------------------------|-----------|----------------|
| Chaparro, 2020 <sup>61</sup> | Arm 10 | Above poverty (>100% to <185% FPL), boys, new package  | 4177               | NR                     | Number of people: NR<br>Mean: 3.94 (95% CI: 1.19)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | >100% to <185% FPL: 100 percent | NR        | NR             |
| Chaparro, 2020 <sup>61</sup> | Arm 11 | Above poverty (>100% to <185% FPL), girls, old package | 4121               | NR                     | Number of people: NR<br>Mean: 3.94 (95% CI: 1.18)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | >100% to <185% FPL: 100 percent | NR        | NR             |
| Chaparro, 2020 <sup>61</sup> | Arm 12 | Above poverty (>100% to <185% FPL), girls, new package | 4121               | NR                     | Number of people: NR<br>Mean: 3.95 (95% CI: 1.21)<br>Number of children <5yrs: NR<br>Number of children: Mean NR | NR               | >100% to <185% FPL: 100 percent | NR        | NR             |

| Author, Year                 | Arm   | Arm Name                | Number at Baseline | Number of Household, n | People in Household | WIC Participants | Household Income  | Geography | Race/Ethnicity |
|------------------------------|-------|-------------------------|--------------------|------------------------|---------------------|------------------|---|-----------|----------------|
| Freedman, 2017 <sup>64</sup> | Arm 1 | WIC-PC Survey year 2000 | 1847324            | NR                     | NR                  | NR               | Relative income, Percentage of federal poverty level: <50: 26.2%<br>50-99: 29.7%<br>100-134: 16.1%<br>≥135: 15.5%<br>Unknown: 12.5% | NR        | NR             |
| Freedman, 2017 <sup>64</sup> | Arm 2 | WIC-PC Survey year 2004 | 2018235            | NR                     | NR                  | NR               | Relative income, Percentage of federal poverty level: <50: 28.6%<br>50-99: 28.6%<br>100-134: 14.9%<br>≥135: 14.7%<br>Unknown: 13.2% | NR        | NR             |

| Author, Year                 | Arm   | Arm Name                | Number at Baseline | Number of Household, n | People in Household | WIC Participants | Household Income   | Geography | Race/Ethnicity |
|------------------------------|-------|-------------------------|--------------------|------------------------|---------------------|------------------|--|-----------|----------------|
| Freedman, 2017 <sup>64</sup> | Arm 3 | WIC-PC Survey year 2010 | 2319712            | NR                     | NR                  | NR               | Relative income, Percentage of federal poverty level: <50: 31.1%<br>50-99: 32.4%<br>100-134: 14.3%<br>≥135: 14.8%<br>Unknown: 7.3% | NR        | NR             |
| Freedman, 2017 <sup>64</sup> | Arm 4 | WIC-PC Survey year 2014 | 2340611            | NR                     | NR                  | NR               | Relative income, Percentage of federal poverty level: <50: 34.5%<br>50-99: 33.0%<br>100-134: 13.1%<br>≥135: 11.3%<br>Unknown: 8.0% | NR        | NR             |

| Author, Year               | Arm   | Arm Name           | Number at Baseline         | Number of Household, n | People in Household  | WIC Participants | Household Income  | Geography | Race/Ethnicity   |
|----------------------------|-------|--------------------|----------------------------|------------------------|--|------------------|---|-----------|--|
| Oberle, 2020 <sup>20</sup> | Arm 1 | Before WIC changes | 231 (representing 951,481) | NA                     | Number of people: 1-2: 6.1% (3.1, 11.4)<br>3-6: 83.2% (76.6, 88.2)<br>≥ 7: 10.7% (7.4, 15.3)<br>Number of children <5yrs: 91% (87.2, 93.7) | NR               | <100% FPL: 59.2% (49.2, 68.5)<br>100-185% FPL: 40.8% (31.5, 50.8) | NR        | NR   |
| Oberle, 2020 <sup>20</sup> | Arm 2 | After WIC changes  | 81 (representing 711,350)  | NA                     | Number of people: 1-2: 10.7% (5.6, 19.7)<br>3-6: 79.8% (71, 86.4)<br>≥ 7: 9.5% (4.8, 17.7)<br>Number of children <5yrs: 83.7% (73.4, 90.6) | NR               | <100% FPL: 66.1% (53.5, 76.8)<br>100-185% FPL: 33.9% (23.2, 46.5) | NR        | NR   |
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC   | 3004                       | 3004                   | Number of people: Mean 4.7 (1.75)<br>Number of children: Mean 2.3  | NR               | Up to \$1999 monthly: 88.7%<br>>2000 monthly: 11.2%               | NR        | Respondent<br>Non-Hispanic-White: NR (9.1)<br>Non-Hispanic-Black or African American: NR (6.1)<br>Other: NR (4.3)<br><br>Non-Hispanic: NR (80.4)<br>Hispanic: NR |

| Author, Year               | Arm   | Arm Name                  | Number at Baseline | Number of Household, n | People in Household  | WIC Participants | Household Income                                    | Geography | Race/Ethnicity   |
|----------------------------|-------|---------------------------|--------------------|------------------------|--|------------------|---|-----------|--|
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC         | 2996               | 2996                   | Number of people: Mean 4.7 (1.89)<br>Number of children: Mean 2.4        | NR               | Up to \$1999 monthly: 89.2%<br>>2000 monthly: 10.8% | NR        | Respondent<br>Non-Hispanic-White: NR (9.4)<br>Non-Hispanic-Black or African American: NR (5.7)<br>Other: NR (5.8)<br><br>Non-Hispanic: NR (79.1)<br>Hispanic: NR |
| Zimmer, 2019 <sup>79</sup> | Arm 1 | Pre-revision (2005-2008)  | 1106               | NR                     | Number of people: Mean No WIC: mean 4.1 (SD 1.2), WIC: mean 4.7 (SD 1.6) | NR               | NR  | NR        | NR   |
| Zimmer, 2019 <sup>79</sup> | Arm 2 | Post-revision (2011-2014) | 997                | NR                     | NR   | NR               | NR  | NR        | NR   |

IQR=interquartile range; NR=not reported; SD=standard deviation; SNAP= Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-21. Maternal age, race/ethnicity, education, relationship, and housing characteristics of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                 | Arm   | Arm Name                             | Number at Baseline | Maternal Category | Age   | Race/Ethnicity  | Education   | Relationship Status | Housing | Employment |
|------------------------------|-------|--------------------------------------|--------------------|-------------------|---|---|---|---------------------|---------|------------|
| Bersak, 2018 <sup>25</sup>   | Arm 1 | WIC                                  | 229934             | Pregnant: 229934  | Age at delivery<br>Mean<br>(SD):<br>24.125<br>(5.405) | Black or African American: NR (48.3)<br>White: NR (50.1)<br>Other: NR (1.5)<br><br>Non-Hispanic: NR<br>Hispanic: NR | Less than HS: (33.4)<br>Less than or equal to HS: NR<br>HS/GED: (34.1)<br>More than HS: (28.7 (some college))<br>College: (3.7) | NR                  | NR      | NR         |
| Bersak, 2018 <sup>25</sup>   | Arm 2 | Non-WIC                              | 60443              | Pregnant: 60443   | Age at delivery<br>Mean<br>(SD):<br>25.509<br>(5.512) | Black or African American: NR (34)<br>White: NR (63.1)<br>Other: NR (2.8)<br><br>Non-Hispanic: NR<br>Hispanic: NR   | Less than HS: (30.8)<br>Less than or equal to HS: NR<br>HS/GED: (29.3)<br>More than HS: (30.9 (some college))<br>College: (8.7) | NR                  | NR      | NR         |
| Bolbocean, 2021 <sup>4</sup> | Arm 1 | Non-WIC participant during pregnancy | 1068               | Pregnant: NR      | Not specified<br><br>NR                               | NR<br><br>NR  | NR  | NR                  | NR      | NR         |
| Bolbocean, 2021 <sup>4</sup> | Arm 2 | WIC participant during pregnancy     | 1068               | Pregnant: NR      | Not specified<br><br>NR                               | NR<br><br>NR  | NR  | NR                  | NR      | NR         |



| Author, Year                | Arm     | Arm Name                                      | Number at Baseline | Maternal Category       | Age  | Race/Ethnicity  | Education   | Relationship Status  | Housing | Employment |
|-----------------------------|---------|---|--------------------|-------------------------|--|---|---|--|---------|------------|
| Li, 2019 <sup>37</sup>      | Overall | Overall                                       | NR                 | Pregnant: NR (100)      | NR   | NR<br><br>Non-Hispanic: NR<br>Hispanic: NR  | NR  | NR   | NR      | NR         |
| Perkins, 2020 <sup>42</sup> | Overall | Adult EFNEP participants                      | 507                | NR                      | Not specified<br>Mean (SD): 32 (9.7)   | White: 431 (0.85)<br>Other: non-White; 76 (15)  | Less than HS: 53 (10.5)<br>Less than or equal to HS: NR<br>HS/GED: 368 (72.5)<br>More than HS: postsecondary school, 86 (post secondary school, 17%)<br>College: NR | NR   | NR      | NR         |
| Soneji, 2019 <sup>15</sup>  | Arm 1   | Did not receive WIC benefits during pregnancy | 2815304            | Pregnant: 2815304 (100) | Age at delivery<br><br><15: 2780 (0.1%)<br>15-19: 214542 (7.6%)<br>20-24: 838695 (29.8%)<br>25-59: 890217 (31.6%)<br>30-34: 561596 (19.9%) | Non-Hispanic-White: 1324811 (47.1)<br>Non-Hispanic-Black or African American: 586573 (20.8)<br>: 216759 (7.7)<br>Other: 216579 (7.7)<br><br>Non-Hispanic: NR<br>Hispanic: 667828 (23.7) | Less than HS: 567817 (20.2)<br>Less than or equal to HS: NR<br>HS/GED: 961653 (34.2)<br>More than HS: 1250751 (44.4)<br>College: NR                                 | Married/Partnered/Cohabiting: 1104843 (39.2)<br>Single: 1666983 (59.2)<br>Separated: NR<br>Other: NR | NR      | NR         |

| Author, Year               | Arm     | Arm Name                               | Number at Baseline | Maternal Category        | Age   | Race/Ethnicity  | Education   | Relationship Status  | Housing | Employment |
|----------------------------|---------|--|--------------------|--------------------------|---|---|---|--|---------|------------|
| Soneji, 2019 <sup>15</sup> | Arm 2   | Received WIC benefits during pregnancy | 8145770            | Pregnant: 8145770 (100)  | Age at delivery<br><br><15: 12047 (0.1%)<br>15-19: 1022293 (12.2%)<br>20-24: 2719455 (33.4%)<br>25-59: 2251694 (27.6%)<br>30-34: 1365272 (16.8%)                                | Non-Hispanic-White: 2861443 (35.1)<br>Non-Hispanic-Black or African American: 1822517 (22.4)<br>: 500188 (6.1)<br>Other: 500188 (6.1)<br><br>Non-Hispanic: NR<br>Hispanic: 2916154 (35.8) | Less than HS: 2311748 (28.4)<br>Less than or equal to HS: NR<br>HS/GED: 3101353 (38.1)<br>More than HS: 2649190 (32.5)<br>College: NR | Married/Partnered/Cohabiting: 2603649 (32)<br>Single: 5383992 (66.1)<br>Separated: NR<br>Other: NR   | NR      | NR         |
| Soneji, 2019 <sup>15</sup> | Overall | All medicaid-insured expectant mothers | 11148261           | Pregnant: 11148261 (100) | Age at delivery Mean (SD): NR, Range: 20-24 (mode)<br><15: 15114 (0.1%)<br>15-19: 1255749 (11.3%)<br>20-24: 3615605 (32.4%)<br>25-59: 3195789 (28.7%)<br>30-34: 1962324 (17.6%) | Non-Hispanic-White: 4257790 (38.2)<br>Non-Hispanic-Black or African American: 2458740 (22.1)<br>: 731013 (6.6)<br>Other: 731013 (6.6)<br><br>Non-Hispanic: NR<br>Hispanic: 3627356 (32.5) | Less than HS: 2922613 (26.2)<br>Less than or equal to HS: NR<br>HS/GED: 4130571 (37.1)<br>More than HS: 3957690 (35.5)<br>College: NR | Married/Partnered/Cohabiting: 3772251 (33.8)<br>Single: 7173141 (64.3)<br>Separated: NR<br>Other: NR | NR      | NR         |

IQR=interquartile range; NIS= National Immunization Survey; NR=not reported; SD=standard deviation; SNAP= Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-22. Maternal age, race/ethnicity, education, relationship, and housing characteristics of studies investigating the Key Question 2 association of the 2009 food package change with dietary and health outcomes**

| Author, Year              | Arm   | Arm Name                   | Number at Baseline | Maternal Category | Age  | Race/Ethnicity  | Education   | Relationship Status  | Housing | Employment |
|---------------------------|-------|----------------------------|--------------------|-------------------|--|---|---|--|---------|------------|
| Joyce, 2015 <sup>67</sup> | Arm 1 | PRAMS 2004 to 2010 Non-WIC | 42029              | Postpartum: (100) | Not specified<br><br><20: 2537 (6%)<br>20-29: 26000 (61.9%)<br>≥30: 12975 (30.9%)<br>Unknown: 517 (1.2)      | Non-Hispanic-White: 27059 (64.4)<br>Non-Hispanic-Black or African American: 4133 (9.8)<br>More than one: 1991 (unknown) (1.4)<br>Other: 3529 (8.4)<br><br>Non-Hispanic: NR<br>Hispanic: 5307 (12.6) | Less than HS: 5303 (12.6)<br>Less than or equal to HS: NR<br>HS/GED: 13209 (31.4)<br>More than HS: 13182 (31.4)<br>College: 9720 (23.1) | Married/Partnered/Cohabiting: 28316 (67.4)<br>Single: 13681 (32.6)<br>Separated: NR<br>Other: 22 (0.1) | NR      | NR         |
| Joyce, 2015 <sup>67</sup> | Arm 1 | PRAMS 2004 to 2010 WIC     | 85458              | Postpartum: (100) | Not specified<br><br><20: 14210 (16.6%)<br>20-29: 52280 (61.2%)<br>≥30: 17644 (20.6%)<br>Unknown: 1324 (1.5) | Non-Hispanic-White: 37725 (44.1)<br>Non-Hispanic-Black or African American: 15558 (18.2)<br>More than one: 5251 (unknown) (2)<br>Other: 6399 (7.5)<br><br>Non-Hispanic: NR<br>Hispanic: 20537 (24)  | Less than HS: 24942 (29.2)<br>Less than or equal to HS: NR<br>HS/GED: 33804 (39.4)<br>More than HS: 19056 (22.3)<br>College: 5934 (6.9) | Married/Partnered/Cohabiting: 33837 (39.6)<br>Single: 51564 (60.3)<br>Separated: NR<br>Other: 57 (0.1) | NR      | NR         |

| Author, Year              | Arm   | Arm Name                 | Number at Baseline | Maternal Category | Age   | Race/Ethnicity  | Education   | Relationship Status   | Housing | Employment |
|---------------------------|-------|--------------------------|--------------------|-------------------|---|---|---|---|---------|------------|
| Joyce, 2015 <sup>67</sup> | Arm 2 | NIS 2004 to 2010 Non-WIC | 11702              | Postpartum: (100) | Not specified<br><br><20: 163 (1.4%)<br>20-29: 4140 (35.4%)<br>≥30: 7399 (63.2%)<br>Unknown: 0 (0)    | Non-Hispanic-White: 7407 (32.7)<br>Non-Hispanic-Black or African American: 907 (19)<br>More than one: 0 (unknown) (0)<br>Other: 1046 (8.1)<br><br>Non-Hispanic: NR<br>Hispanic: 2341 (40.2)     | Less than HS: 1507 (12.9)<br>Less than or equal to HS: NR<br>HS/GED: 3993 (34.1)<br>More than HS: 3071 (26.2)<br>College: 3131 (26.8) | Married/Partnered/Cohabiting: 9321 (79.7)<br>Single: 2381 (20.4)<br>Separated: NR<br>Other: 0 (0)   | NR      | NR         |
| Joyce, 2015 <sup>67</sup> | Arm 2 | NIS 2004 to 2010 WIC     | 62289              | Postpartum: (100) | Not specified<br><br><20: 3069 (4.9%)<br>20-29: 33503 (53.8%)<br>≥30: 25717 (41.3%)<br>Unknown: 0 (0) | Non-Hispanic-White: 20382 (32.7)<br>Non-Hispanic-Black or African American: 11824 (19)<br>More than one: 1 (unknown) (0)<br>Other: 5070 (8.1)<br><br>Non-Hispanic: NR<br>Hispanic: 25013 (40.2) | Less than HS: 20298 (32.6)<br>Less than or equal to HS: NR<br>HS/GED: 25544 (41)<br>More than HS: 11956 (19.2)<br>College: 4491 (7.2) | Married/Partnered/Cohabiting: 30293 (48.6)<br>Single: 31996 (51.4)<br>Separated: NR<br>Other: 0 (0) | NR      | NR         |

| Author, Year               | Arm   | Arm Name          | Number at Baseline | Maternal Category  | Age                                     | Race/Ethnicity                             | Education  | Relationship Status | Housing | Employment |
|----------------------------|-------|-------------------|--------------------|--------------------|---|--|--|---------------------|---------|------------|
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC  | 3004               | Pregnant: NR (8.9) | Not specified<br>Mean (SD): 29.2 (6.89) | NR<br><br>Non-Hispanic: NR<br>Hispanic: NR | Less than HS: NR (45.7)<br>Less than or equal to HS: NR<br>HS/GED: NR (29.1)<br>More than HS: NR (25)<br>College: NR   | NR                  | NR      | NR         |
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC | 2996               | Pregnant: NR (8.9) | Not specified<br>Mean (SD): 29.4 (6.74) | NR<br><br>Non-Hispanic: NR<br>Hispanic: NR | Less than HS: NR (43.1)<br>Less than or equal to HS: NR<br>HS/GED: NR (29.9)<br>More than HS: NR (26.5)<br>College: NR | NR                  | NR      | NR         |

IQR=interquartile range; NIS= National Immunization Survey; NR=not reported; SD=standard deviation; SNAP= Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-23. Maternal employment, geography, parity, pregnancy, maternal health characteristics of studies investigating the Key Question 2 association between dietary and health outcomes and infant and WIC participation compared with eligible non-participants**

| Author, Year                 | Arm     | Arm Name                                      | Number at Baseline | Employment | Geography   | Parity  | Pregnancy BMI | Maternal Health History   | Maternal Morbidities  |
|------------------------------|---------|---|--------------------|------------|---|---|---------------|---|---|
| Bersak, 2018 <sup>25</sup>   | Arm 1   | WIC   | 229934             | NR         | NR  | Primiparous:<br>Multiparous:<br>2.151 (1.199) | NR            | Pre-existing DM: NR (1.1)<br>Prior GDM:<br>Prior HT: NR (2.6)<br>Depression:<br>Substance abuse:                | GDM: (4.7)<br>HT: (5.4)<br>Previous poor birth outcome: (6.3)             |
| Bersak, 2018 <sup>25</sup>   | Arm 2   | Non-WIC                                       | 60443              | NR         | NR  | NR  | NR            | Pre-existing DM: NR (0.8)<br>Prior GDM:<br>Prior HT: NR (2.2)<br>Depression:<br>Substance abuse:                | GDM: (4.2)<br>HT: (5.1)<br>Previous poor birth outcome: (6.5)             |
| Bolbocean, 2021 <sup>4</sup> | Arm 1   | Non-WIC participant during pregnancy          | 1068               | NR         | NR  | NR  | NR            | NR  | NR  |
| Bolbocean, 2021 <sup>4</sup> | Arm 2   | WIC participant during pregnancy              | 1068               | NR         | NR  | NR  | NR            | NR  | NR  |
| Li, 2019 <sup>37</sup>       | Overall | Overall                                       |                    | NR         | NR  | NR  | NR            | NR  | NR  |
| Perkins, 2020 <sup>42</sup>  | Overall | Adult EFNEP participants                      | 507                | NR         | Urban: 156 (30.8)<br>Rural: NR<br>Suburban: 351 (69.2)<br>Mixed: NR | NR  | NR            | NR  | NR  |
| Soneji, 2019 <sup>15</sup>   | Arm 1   | Did not receive WIC benefits during pregnancy | 2815304            | NR         | NR  | Primiparous:<br>850103<br>Multiparous: NR     | NR            | Pre-existing DM: 21600 (0.8)<br>Prior GDM: NR<br>Prior HT: 46100 (1.6)<br>Depression: NR<br>Substance abuse: NR | GDM: 141162 (5)<br>HT: 148067 (5.3)<br>Hypertension eclampsia: 7277 (0.3) |

| Author, Year               | Arm     | Arm Name                               | Number at Baseline | Employment | Geography | Parity                                  | Pregnancy BMI | Maternal Health History   | Maternal Morbidities   |
|----------------------------|---------|--|--------------------|------------|-----------|---|---------------|---|--|
| Soneji, 2019 <sup>15</sup> | Arm 2   | Received WIC benefits during pregnancy | 8145770            | NR         | NR        | Primiparous: 2956600<br>Multiparous: NR | NR            | Pre-existing DM: 81046 (1)<br>Prior GDM: NR<br>Prior HT: 139894 (1.7)<br>Depression: NR<br>Substance abuse: NR    | GDM: 452736 (5.6)<br>HT: 425725 (5.2)<br>Hypertension eclampsia: 19508 (0.2) |
| Soneji, 2019 <sup>15</sup> | Overall | All medicaid-insured expectant mothers | 11148261           | NR         | NR        | Primiparous: 3869326<br>Multiparous: NR | NR            | Pre-existing DM: 104503 (0.3)<br>Prior GDM: NR<br>Prior HT: 189437 (1.7)<br>Depression: NR<br>Substance abuse: NR | GDM: 603330 (5.4)<br>HT: 582720 (5.2)<br>Hypertension eclampsia: 27517 (0.2) |

DM=diabetes mellitus; GDM=gestational diabetes mellitus; HT=hypertension; NIS= National Immunization Survey; NR=not reported; PRAMS=Pregnancy Risk Assessment Monitoring System; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-24. Maternal employment, geography, parity, pregnancy, maternal health characteristics of studies investigating the Key Question 2 association of the 2009 food package change with dietary and health outcomes**

| Author, Year               | Arm   | Arm Name                   | Number at Baseline | Employment | Geography | Parity | Pregnancy BMI | Maternal Health History | Maternal Morbidities |
|----------------------------|-------|----------------------------|--------------------|------------|-----------|--------|---------------|-------------------------|----------------------|
| Joyce, 2015 <sup>67</sup>  | Arm 1 | PRAMS 2004 to 2010 Non-WIC | 42029              | NR         | NR        | NR     | NR            | NR                      | NR                   |
| Joyce, 2015 <sup>67</sup>  | Arm 1 | PRAMS 2004 to 2010 WIC     | 85458              | NR         | NR        | NR     | NR            | NR                      | NR                   |
| Joyce, 2015 <sup>67</sup>  | Arm 2 | NIS 2004 to 2010 Non-WIC   | 11702              | NR         | NR        | NR     | NR            | NR                      | NR                   |
| Joyce, 2015 <sup>67</sup>  | Arm 2 | NIS 2004 to 2010 WIC       | 62289              | NR         | NR        | NR     | NR            | NR                      | NR                   |
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC           | 3004               | NR         | NR        | NR     | NR            | NR                      | NR                   |
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC          | 2996               | NR         | NR        | NR     | NR            | NR                      | NR                   |

DM=diabetes mellitus; GDM=gestational diabetes mellitus; HT=hypertension; NIS= National Immunization Survey; NR=not reported; PRAMS=Pregnancy Risk Assessment Monitoring System; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-25. Newborn characteristics of studies investigating the Key Question 2 association between dietary and health outcomes and infant and WIC participation compared with eligible non-participants**

| Author, Year               | Arm     | Arm Name                                      | Number at Baseline | Sex, n(%) | Gestational Age, n(%)  | Birthweight | Comments   |
|----------------------------|---------|---|--------------------|-----------|--|-------------|--|
| Soneji, 2019 <sup>15</sup> | Arm 1   | Did not receive WIC benefits during pregnancy | NR                 | NR        | NR<br>Preterm: 397828 (0.04)<br>Early term: NR<br>Late term: NR  | NR          | Gestational age category reported as:<br>Arm 1: Extremely preterm: 34800 (1.2%);<br>Very preterm: 46873 (1.7%); Moderate-to-late preterm: 316155 (11.2%); Normal term: 2413521 (85.7%); Unknown or missing data on gestational age category: 3955 (0.1%)       |
| Soneji, 2019 <sup>15</sup> | Arm 1   | Did not receive WIC benefits during pregnancy | NR                 | NR        | NR   | NR          | NR   |
| Soneji, 2019 <sup>15</sup> | Arm 2   | Received WIC benefits during pregnancy        | NR                 | NR        | NR<br>Preterm: 1015082 (0.09)<br>Early term: NR<br>Late term: NR | NR          | Gestational age category reported as:<br>Arm 2: Extremely preterm: 56558 (0.7%);<br>Very preterm: 105448 (1.3%); Moderate-to-late preterm: 853076 (10.5%); Normal term: 7126798 (87.5%); Unknown or missing data on gestational age category: 3890 (% missing) |
| Soneji, 2019 <sup>15</sup> | Arm 2   | Received WIC benefits during pregnancy        | NR                 | NR        | NR   | NR          | NR   |
| Soneji, 2019 <sup>15</sup> | Overall | All medicaid-insured expectant mothers        | NR                 | NR        | NR<br>Preterm: 2971082 (0.27)<br>Early term: NR<br>Late term: NR | NR          | Gestational age category reported as:<br>Overall: Extremely preterm: 94979 (0.9%); Very preterm: 155685 (1.4%); Moderate-to-late preterm: 1190100 (10.7%); Normal term: 9698970 (87%); Unknown or missing data on gestational age category: 8527 (0.1%)        |
| Soneji, 2019 <sup>15</sup> | Overall | All publicly insured mothers                  | NR                 | NR        | NR   | NR          | NR   |

LGA=large for gestational age; n=sample size; NR=not reported; SD=standard deviation; SGA=small for gestational age; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-26. Characteristics of mother or caregiver of infant and child in studies investigating the Key Question 2 association between dietary and health outcomes and infant and WIC participation compared with eligible non-participants**

| Author, Year                 | Arm     | Arm Name                          | Number at Baseline                     | Age of Mother, n(%)   | Race/Ethnicity of Mother, n(%) | Education   | Employment | Housing | Caregiver BMI |
|------------------------------|---------|-----------------------------------|--|---|--------------------------------|---|------------|---------|---------------|
| Bolbocean, 2021 <sup>4</sup> | Arm 1   | Receiving WIC at age 1, not age 2 | NR                                     | NR  | NR                             | NR  | NR         | NR      | NR            |
| Bolbocean, 2021 <sup>4</sup> | Arm 2   | Receiving WIC at age 1 and 2      | NR                                     | NR  | NR                             | NR  | NR         | NR      | NR            |
| Bolbocean, 2021 <sup>4</sup> | Overall | Overall                           | Range in analyses: 1525-1694           | NR  | NR                             | NR  | NR         | NR      | NR            |
| Kay, 2021 <sup>35</sup>      | Arm 1   | WIC                               | 306                                    | NR  | NR                             | NR  | NR         | NR      | NR            |
| Kay, 2021 <sup>35</sup>      | Arm 2   | WIC Eligible                      | 160                                    | NR  | NR                             | NR  | NR         | NR      | NR            |
| Kay, 2021 <sup>35</sup>      | Arm 3   | Non-WIC                           | 409                                    | NR  | NR                             | NR  | NR         | NR      | NR            |
| Gleason, 2020 <sup>7</sup>   | Overall | WIC Participants                  | unweighted n=1,235; weighted n=319,083 | Age at delivery<br>16-19: NR (weighted %=17%)<br>20-25: NR (weighted %=38.2%)<br>≥26: NR (weighted %=49.7%) | NR                             | Less than HS: NR<br>Less than or equal to HS: NR (weighted %=59.5)<br>HS/GED: NR<br>More than HS: NR (weighted %=40.5)<br>College: NR | NR         | NR      | NR            |
| Perkins, 2020 <sup>42</sup>  | Overall | Overall                           | NR                                     | NR  | NR                             | NR  | NR         | NR      | NR            |
| Rhee, 2019 <sup>12</sup>     | Overall | Overall                           | 3366                                   | NR  | NR                             | NR  | NR         | NR      | NR            |
| Zimmer, 2020 <sup>50</sup>   | Arm 1   | Higher income children            | 360                                    | NR  | NR                             | NR  | NR         | NR      | NR            |
| Zimmer, 2020 <sup>50</sup>   | Arm 2   | WIC eligible nonparticipants      | 224                                    | NR  | NR                             | NR  | NR         | NR      | NR            |
| Zimmer, 2020 <sup>50</sup>   | Arm 3   | WIC Participants                  | 463                                    | NR  | NR                             | NR  | NR         | NR      | NR            |

GED=General Education Development; HS=high school; n=sample size; NR=not reported; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-27. Characteristics of mother or caregiver of infant and child in studies investigating the Key Question 2 association of the 2009 food package change with dietary and health outcomes**

| Author, Year                 | Arm   | Arm Name                                       | Number at Baseline | Age of Mother, n(%) | Race/Ethnicity of Mother, n(%) | Education  | Employment | Housing | Caregiver BMI |
|------------------------------|-------|--|--------------------|---------------------|--------------------------------|--|------------|---------|---------------|
| Chaparro, 2020 <sup>61</sup> | Arm 1 | Very low income (<50% FPL), boys, old package  | 5433               | NR                  | NR                             | Less than HS: 3446 (63.4)<br>Less than or equal to HS: NR<br>HS/GED: 1600 (29.5)<br>More than HS: 387 (7.1)<br>College: NR | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 2 | Very low income (<50% FPL), boys, new package  | 5433               | NR                  | NR                             | Less than HS: 3446 (63.4)<br>Less than or equal to HS: NR<br>HS/GED: 1600 (29.5)<br>More than HS: 387 (7.1)<br>College: NR | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 3 | Very low income (<50% FPL), girls, old package | 5294               | NR                  | NR                             | Less than HS: 3411 (64.4)<br>Less than or equal to HS: NR<br>HS/GED: 1533 (29)<br>More than HS: 350 (6.6)<br>College: NR   | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 4 | Very low income (<50% FPL), girls, new package | 5294               | NR                  | NR                             | Less than HS: 3411 (64.4)<br>Less than or equal to HS: NR<br>HS/GED: 1533 (29)<br>More than HS: 350 (6.6)<br>College: NR   | NR         | NR      | NR            |

| Author, Year                 | Arm   | Arm Name                                     | Number at Baseline | Age of Mother, n(%) | Race/Ethnicity of Mother, n(%) | Education  | Employment | Housing | Caregiver BMI |
|------------------------------|-------|--|--------------------|---------------------|--------------------------------|--|------------|---------|---------------|
| Chaparro, 2020 <sup>61</sup> | Arm 5 | Low income (50-100% FPL), boys, old package  | 10520              | NR                  | NR                             | Less than HS: 6239 (59.3)<br>Less than or equal to HS: NR<br>HS/GED: 3327 (31.6)<br>More than HS: 954 (9.1)<br>College: NR | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 6 | Low income (50-100% FPL), boys, new package  | 10520              | NR                  | NR                             | Less than HS: 6239 (59.3)<br>Less than or equal to HS: NR<br>HS/GED: 3327 (31.6)<br>More than HS: 954 (9.1)<br>College: NR | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 7 | Low income (50-100% FPL), girls, old package | 10206              | NR                  | NR                             | Less than HS: 6091 (59.7)<br>Less than or equal to HS: NR<br>HS/GED: 3162 (31)<br>More than HS: 953 (9.3)<br>College: NR   | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 8 | Low income (50-100% FPL), girls, new package | 10206              | NR                  | NR                             | Less than HS: 6091 (59.7)<br>Less than or equal to HS: NR<br>HS/GED: 3162 (31)<br>More than HS: 953 (9.3)<br>College: NR   | NR         | NR      | NR            |

| Author, Year                 | Arm    | Arm Name   | Number at Baseline | Age of Mother, n(%) | Race/Ethnicity of Mother, n(%) | Education   | Employment | Housing | Caregiver BMI |
|------------------------------|--------|--|--------------------|---------------------|--------------------------------|---|------------|---------|---------------|
| Chaparro, 2020 <sup>61</sup> | Arm 9  | Above poverty (>100% to <185% FPL), boys, old package  | 4177               | NR                  | NR                             | Less than HS: 1785 (42.7)<br>Less than or equal to HS: NR<br>HS/GED: 1674 (40.1)<br>More than HS: 718 (17.2)<br>College: NR | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 10 | Above poverty (>100% to <185% FPL), boys, new package  | 4177               | NR                  | NR                             | Less than HS: 1785 (42.7)<br>Less than or equal to HS: NR<br>HS/GED: 1674 (40.1)<br>More than HS: 718 (17.2)<br>College: NR | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 11 | Above poverty (>100% to <185% FPL), girls, old package | 4121               | NR                  | NR                             | Less than HS: 1812 (44)<br>Less than or equal to HS: NR<br>HS/GED: 1650 (40)<br>More than HS: 659 (16)<br>College: NR       | NR         | NR      | NR            |
| Chaparro, 2020 <sup>61</sup> | Arm 12 | Above poverty (>100% to <185% FPL), girls, new package | 4121               | NR                  | NR                             | Less than HS: 1812 (44)<br>Less than or equal to HS: NR<br>HS/GED: 1650 (40)<br>More than HS: 659 (16)<br>College: NR       | NR         | NR      | NR            |
| Freedman, 2017 <sup>64</sup> | Arm 1  | WIC-PC Survey year 2000                                | 1847324            | NR                  | NR                             | NR  | NR         | NR      | NR            |
| Freedman, 2017 <sup>64</sup> | Arm 2  | WIC-PC Survey year 2004                                | 2018235            | NR                  | NR                             | NR  | NR         | NR      | NR            |

| Author, Year                    | Arm     | Arm Name   | Number at Baseline | Age of Mother, n(%)                    | Race/Ethnicity of Mother, n(%)  | Education  | Employment                          | Housing | Caregiver BMI  |
|---------------------------------|---------|--|--------------------|--|---|--|-------------------------------------|---------|--|
| Freedman, 2017 <sup>64</sup>    | Arm 3   | WIC-PC Survey year 2010                                      | 2319712            | NR                                     | NR  | NR   | NR                                  | NR      | NR   |
| Freedman, 2017 <sup>64</sup>    | Arm 4   | WIC-PC Survey year 2014                                      | 2340611            | NR                                     | NR  | NR   | NR                                  | NR      | NR   |
| Kong, 2014 <sup>19</sup>        | Arm 1   | Hispanic   | 112                | Not specified<br>Mean (SD): 31.4 (5.6) | NR<br><br>Non-Hispanic: 112 (100)<br>Hispanic: NR                           | Less than HS: NR<br>Less than or equal to HS: NR<br>HS/GED: 56 (50)<br>More than HS: NR<br>College: NR | Employed: 13 (12)<br>Unemployed: NR | NR      | Mean (SD): 31 (6.9)<br>Overweight: 42 (39)<br>Obese: 49 (45)   |
| Kong, 2014 <sup>19</sup>        | Arm 2   | African American   | 97                 | Not specified<br>Mean (SD): 32.2 (9.8) | Black or African American: 97 (100)<br><br>NR                               | Less than HS: NR<br>Less than or equal to HS: NR<br>HS/GED: 77 (79)<br>More than HS: NR<br>College: NR | Employed: 14 (15)<br>Unemployed: NR | NR      | Mean (SD): 30.8 (7.1)<br>Overweight: 26 (31)<br>Obese: 41 (49) |
| Odoms-Young, 2014 <sup>72</sup> | Overall | Hispanic (demographics stratified by race/ethnicity)         | 143                | Mean (SD): 29.3 (5.8)                  | Black or African American: NR<br><br>Non-Hispanic: 143 (NR)<br>Hispanic: NR | See Other Baselines  | Employed: 21 (15)<br>Unemployed: NR | NR      | NR   |
| Odoms-Young, 2014 <sup>72</sup> | Overall | African American (demographics stratified by race/ethnicity) | 120                | Mean (SD): 30.2 (9.4)                  | Black or African American: 130 (NR)<br><br>Non-Hispanic: NR<br>Hispanic: NR | See Other Baselines  | Employed: 21 (16)<br>Unemployed: NR | NR      | NR   |
| Pan, 2021 <sup>75</sup>         | Arm 1   | WIC-PC Survey year 2010                                      | 2319712            | NR                                     | NR  | NR   | NR                                  | NR      | NR   |
| Pan, 2021 <sup>75</sup>         | Arm 2   | WIC-PC Survey year 2012                                      | 2277422            | NR                                     | NR  | NR   | NR                                  | NR      | NR   |

| <b>Author, Year</b>     | <b>Arm</b> | <b>Arm Name</b>         | <b>Number at Baseline</b> | <b>Age of Mother, n(%)</b> | <b>Race/Ethnicity of Mother, n(%)</b> | <b>Education</b> | <b>Employment</b> | <b>Housing</b> | <b>Caregiver BMI</b> |
|-------------------------|------------|-------------------------|---------------------------|----------------------------|---------------------------------------|------------------|-------------------|----------------|----------------------|
| Pan, 2021 <sup>75</sup> | Arm 3      | WIC-PC Survey year 2014 | 2340611                   | NR                         | NR                                    | NR               | NR                | NR             | NR                   |
| Pan, 2021 <sup>75</sup> | Arm 4      | WIC-PC Survey year 2016 | 2345567                   | NR                         | NR                                    | NR               | NR                | NR             | NR                   |
| Pan, 2021 <sup>75</sup> | Arm 5      | WIC-PC Survey year 2018 | 2083443                   | NR                         | NR                                    | NR               | NR                | NR             | NR                   |

GED=General Education Development; HS=high school; n=sample size; NR=not reported; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-28. Infant and child characteristics of studies investigating the Key Question 2 association between dietary and health outcomes and infant and WIC participation compared with eligible non-participants**

| Author, Year                | Arm     | Arm Name                                       | Number at Baseline | Sex, n(%)                           | Age of Children                                   | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|-----------------------------|---------|--|--------------------|-------------------------------------|---|--|--------------------------|------------------------------------|---------------------|---|
| Arons, 2016 <sup>23</sup>   | Overall | Overall time invariant                         | 327                | Boy: 164 (50.2)<br>Girl: 163 (49.9) | NR  | NR   | NR                       | 300 (91.7%)                        | NR                  | also notes maternal marital status  |
| Arons, 2016 <sup>23</sup>   | Overall | Overall time varying characteristics 12 months | 327                | NR                                  | Median: 12 months<br>12 months: NR                | NR   | NR                       | NR                                 | NR                  | WIC participation n=155 (47.4%); high parenting stress n=52 (16.1%)   |
| Arons, 2016 <sup>23</sup>   | Overall | Overall time varying characteristics 24 months | 327                | NR                                  | Median: 24 months<br>24 months: NR                | NR   | NR                       | NR                                 | NR                  | WIC participation n=226 (69.1%); high parenting stress n=45 (13.8%)   |
| Barrera, 2018 <sup>24</sup> | Overall | Overall  | 1482               | Boy: 755 (51.7)<br>Girl: 727 (48.3) | Mean (SD): 16.4 (7.8)<br>Range: 6-36 months<br>NR | Non-Hispanic-White: 479 (52.4)<br>Non-Hispanic-Black or African American: 287 (12.5)<br><br>Non-Hispanic: 562 (26.3)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Breastfeeding status: ≥4 months, n=558, 43.3%; never or <4 months, n=924; 56.7%; maternal smoking during pregnancy: Yes 147 (9.5%), No 1225 (90.5%) |
| Bersak, 2018 <sup>25</sup>  | Arm 1   | WIC  | 229934             | Boy: NR (51)<br>Girl: NR            | NR  | NR   | NR                       | NR (100%)                          | NR                  | Plural birth (3.0% vs 3.2%)   |
| Bersak, 2018 <sup>25</sup>  | Arm 2   | Non-WIC  | 60443              | Boy: NR (51)<br>Girl: NR            | NR  | NR   | NR                       | NR (100%)                          | NR                  | Birthweight Mean (sd) 3149.857 (584.350) vs 3129.300 (660.541)  |

| Author, Year              | Arm   | Arm Name    | Number at Baseline          | Sex, n(%)                    | Age of Children                           | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|---------------------------|-------|-------------|-----------------------------|------------------------------|---|---|--------------------------|------------------------------------|---------------------|---|
| Black, 2012 <sup>26</sup> | Arm 1 | 0 stressors | 16454 caregiver-child pairs | Boy: 8785 (53.4)<br>Girl: NR | Mean (SD): 11.1 months (9.5 months)<br>NR | Asian: 209 (1.3)<br>Black or African American: 9692 (58.9)<br>White: 2247 (13.7)<br>American Indian/Alaska Native: 113 (0.7)<br><br>Non-Hispanic: 4136 (25.1)<br>Hispanic: NR | NR                       | NR                                 | NR                  | breastfed 8772 (53.3%); low birth weight 2266 (13.8%) / CAREGIVER: US Born 11850 (72%); married 6171 (37.5%)  |
| Black, 2012 <sup>26</sup> | Arm 2 | 1 stressor  | 8050 caregiver-child pairs  | Boy: 4243 (52.7)<br>Girl: NR | Mean (SD): 11.5 months (9.6 months)<br>NR | Asian: 69 (0.9)<br>Black or African American: 4021 (50)<br>White: 932 (11.6)<br>American Indian/Alaska Native: 61 (0.8)<br><br>Non-Hispanic: 2941 (36.5)<br>Hispanic: NR      | NR                       | NR                                 | NR                  | breastfed 4778 (59.4%); low birth weight 1181 (14.7%) / CAREGIVER: US Born 5036 (62.6%); married 3213 (39.9%) |
| Black, 2012 <sup>26</sup> | Arm 3 | 2 stressors | 2446 caregiver-child pairs  | Boy: 1310 (53.6)<br>Girl: NR | Mean (SD): 12.2 months (9.8 months)<br>NR | Asian: 13 (0.5)<br>Black or African American: 1119 (45.7)<br>White: 303 (12.4)<br>American Indian/Alaska Native: 37 (1.5)<br><br>Non-Hispanic: 964 (39.4)<br>Hispanic: NR     | NR                       | NR                                 | NR                  | breastfed 1525 (62.3%); low birth weight 367 (15%) / CAREGIVER: US Born 1549 (63.3%); married 824 (33.7%)     |

| Author, Year                 | Arm     | Arm Name                          | Number at Baseline           | Sex, n(%)                         | Age of Children   | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|---------|-----------------------------------|------------------------------|-----------------------------------|---|---|--------------------------|------------------------------------|---------------------|---|
| Bolbocean, 2021 <sup>4</sup> | Arm 1   | Receiving WIC at age 1, not age 2 | NR                           | NR                                | NR  | NR  | NR                       | NR                                 | NR                  | NR  |
| Bolbocean, 2021 <sup>4</sup> | Arm 2   | Receiving WIC at age 1 and 2      | NR                           | NR                                | NR  | NR  | NR                       | NR                                 | NR                  | NR  |
| Bolbocean, 2021 <sup>4</sup> | Overall | Overall                           | Range in analyses: 1525-1694 | NR                                | NR  | NR  | NR                       | NR                                 | NR                  | NR  |
| Casillas, 2017 <sup>27</sup> | Overall | Overall                           | 13460                        | Boy: NR (51.2)<br>Girl: NR (48.8) | Range: 19-35 months<br>19-23: NR (30)<br>24-29: NR (34)<br>30-35: NR (36) | Non-Hispanic-White: NR (47.9)<br>Non-Hispanic-Black or African American: NR (12.7)<br>NR: NR<br>Other: Non-Hispanic other and multiple race (12.2)<br><br>Non-Hispanic: NR (27.2)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal marital status: married, 62.4%, never married/widowed/divorced/separated/deceased, 37.6%; census region: Northeast 16.3%, Midwest 20.8%, South 38.4%, West 24.5%; First-born status of child: first born 40.0%; not first born 60.0%; ever received WIC benefit: yes 58.1%, no 41.6%, never heard of WIC/do not know 0.3%. |
| Gu, 2017 <sup>29</sup>       | Arm 1   | Did not receive WIC, 2009-2010    | 305                          | NR                                | Range: 44232<br>2 to 5: 305 (100)   | NR  | NR                       | NR                                 | NR                  | NR  |
| Gu, 2017 <sup>29</sup>       | Arm 2   | Received WIC, 2009-2010           | 775                          | NR                                | Range: 44232<br>2 to 5: 775 (100)   | NR  | NR                       | NR                                 | NR                  | NR  |

| Author, Year           | Arm   | Arm Name                       | Number at Baseline | Sex, n(%) | Age of Children                   | Race/Ethnicity of Children, n (%) | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|------------------------|-------|--------------------------------|--------------------|-----------|-----------------------------------|-----------------------------------|--------------------------|------------------------------------|---------------------|--------------------------------|
| Gu, 2017 <sup>29</sup> | Arm 3 | Did not receive WIC, 2011-2012 | 312                | NR        | Range: 44232<br>2 to 5: 312 (100) | NR                                | NR                       | NR                                 | NR                  | NR                             |
| Gu, 2017 <sup>29</sup> | Arm 4 | Received WIC, 2011-2012        | 757                | NR        | Range: 44232<br>2 to 5: 757 (100) | NR                                | NR                       | NR                                 | NR                  | NR                             |

|                        |         |         |       |  |  |  |    |    |    |   |
|------------------------|---------|---------|-------|--|--|--|----|----|----|---|
| Gu, 2017 <sup>29</sup> | Overall | Overall | 38487 | Boy:<br>1999-<br>2000: 1822<br>(50.8%)<br>2001-<br>2002: 2000<br>(49.5%)<br>2003-<br>2004: 3390<br>(49.6%)<br>2005-<br>2006: 3534<br>(49.0%)<br>2007-<br>2008: 2782<br>(51.5%)<br>2009-<br>2010: 2970<br>(51.6%)<br>2011-<br>2012: 2850<br>(50.5%)<br>Girl:<br>1999-<br>2000: 1768<br>(49.2%)<br>2001-<br>2002: 2039<br>(50.5%)<br>2003-<br>2004: 3451<br>(50.4%)<br>2005- | NR<br>24-60: 1999-<br>2000: 665<br>(18.5%)<br>2001-2002: 856<br>(21.2%)<br>2003-2004: 1455<br>(21.3%)<br>2005-2006: 1692<br>(23.5%)<br>2007-2008: 1494<br>(27.7%)<br>2009-2010: 1570<br>(27.3%)<br>2011-2012: 1550<br>(27.4%)<br>72-132: 1999-<br>2000: 961<br>(26.8%)<br>2001-2002: 1136<br>(28.1%)<br>2003-2004: 1729<br>(25.3%)<br>2005-2006: 1942<br>(26.9%)<br>2007-2008: 2022<br>(37.4%)<br>2009-2010: 2121<br>(36.9%)<br>2011-2012: 2172<br>(38.4%)<br>144-216: 1999-<br>2000: 1964<br>(54.7%)<br>2001-2002: 2047<br>(50.7%)<br>2003-2004: 3657<br>(53.5%)<br>2005-2006: 3581<br>(49.6%)<br>2007-2008: 1886<br>(34.9%)<br>2009-2010: 2060 | Non-Hispanic-<br>White: 1999-<br>2000: 786<br>(21.9%)<br>2001-2002: 1258<br>(31.1%)<br>2003-2004: 1889<br>(27.6%)<br>2005-2006: 1944<br>(26.9%)<br>2007-2008: 1772<br>(32.8%)<br>2009-2010: 1959<br>(34.1%)<br>2011-2012: 1261<br>(22.3%)<br>Non-Hispanic-<br>Black or African<br>American: 1999-<br>2000: 999<br>(27.8%)<br>2001-2002: 1225<br>(30.3%)<br>2003-2004: 2339<br>(34.2%)<br>2005-2006: 2206<br>(30.6%)<br>2007-2008: 1343<br>(24.8%)<br>2009-2010: 1111<br>(19.3%)<br>2011-2012: 1645<br>(29.1%)<br>Other: 1999-<br>2000: 323 (9.0%)<br>2001-2002: 367<br>(9.1%)<br>2003-2004: 545<br>(8.0%)<br>2005-2006: 662<br>(9.2%)<br>2007-2008: 930<br>(17.2%) | NR | NR | NR | Weight status is available. If relevant I can abstract. |
|------------------------|---------|---------|-------|--|--|--|----|----|----|---|

| Author, Year           | Arm              | Arm Name | Number at Baseline | Sex, n(%)   | Age of Children                    | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|------------------------|------------------|----------|--------------------|---|------------------------------------|--|--------------------------|------------------------------------|---------------------|--------------------------------|
|                        |                  |          |                    | 2006: 3681 (51.0%)<br>2007-2008: 2620 (48.5%)<br>2009-2010: 2781 (48.4%)<br>2011-2012: 2799 (49.5%) | (35.8%)<br>2011-2012: 1972 (34.1%) | 2009-2010: 1081 (18.8%)<br>2011-2012: 1651 (29.2%)<br><br>Non-Hispanic:<br>1999-2000: 1482 (41.3%)<br>2001-2002: 1189 (29.4%)<br>2003-2004: 2068 (30.2%)<br>2005-2006: 2403 (33.3%)<br>2007-2008: 1358 (25.1%)<br>2009-2010: 1600 (27.8%)<br>2011-2012: 1092 (19.3%)<br>Hispanic: NR |                          |                                    |                     |                                |
| Gu, 2017 <sup>29</sup> | Overall, 2009-10 | overall  | 5590               | NR  | NR<br>24-60: 1570 (27.3)           | non-hisp white: 1959 (34.1)<br>Non-Hisp Black: 1111 (19.3)<br>Other: 1081 (18.8)<br><br>Non-Hispanic: NR<br>Hispanic: NR   | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                | Arm              | Arm Name                                      | Number at Baseline | Sex, n(%)                  | Age of Children          | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|-----------------------------|------------------|---|--------------------|----------------------------|--------------------------|--|--------------------------|------------------------------------|---------------------|--------------------------------|
| Gu, 2017 <sup>29</sup>      | Overall, 2011-12 | overall                                       | 5649               | NR                         | NR<br>24-60: 1550 (38.4) | non-hisp white: 1261 (22.3)<br>Non-Hisp Black: 1645 (29.1)<br>Other: 1651 (29.2)<br><br>Non-Hispanic: NR<br>Hispanic: NR                       | NR                       | NR                                 | NR                  | NR                             |
| Guan, 2021 <sup>30</sup>    | Arm 1            | Pre-2009                                      | NR                 | NR                         | NR<br>NR                 | NR   | NR                       | NR (100%)                          | NR                  | NR                             |
| Guan, 2021 <sup>30</sup>    | Arm 2            | Post-2009                                     | 398.3              | NR                         | NR<br>NR                 | NR   | NR                       | NR (100%)                          | NR                  | NR                             |
| Guan, 2021 <sup>30</sup>    | Overall          | Overall arm                                   | 700                | Boy: NR<br>Girl: NR (49.6) | NR<br>NR                 | NR   | NR                       | 700 (100%)                         | NR                  | NR                             |
| Guthrie, 2018 <sup>31</sup> | Arm 1            | WIC Participant                               | 375                | NR                         | NR                       | NR   | NR                       | NR                                 | NR                  | NR                             |
| Guthrie, 2018 <sup>31</sup> | Arm 2            | Non-WIC - Lower income                        | 169                | NR                         | NR                       | NR   | NR                       | NR                                 | NR                  | NR                             |
| Guthrie, 2018 <sup>31</sup> | Arm 3            | Non- WIC - Higher Income                      | 357                | NR                         | NR                       | NR   | NR                       | NR                                 | NR                  | NR                             |
| Guthrie, 2018 <sup>31</sup> | Overall          | All participants (all ages, including < 6 mo) | 3,229              | NR                         | NR                       | Non-Hispanic-White: NR (67)<br>Non-Hispanic-Black or African American: NR (14)<br>Other: NR (4.6)<br><br>Non-Hispanic: NR (15)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                | Arm     | Arm Name                                | Number at Baseline | Sex, n(%) | Age of Children | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|-----------------------------|---------|---|--------------------|-----------|-----------------|--|--------------------------|------------------------------------|---------------------|--------------------------------|
| Guthrie, 2018 <sup>31</sup> | Overall | All WIC Participants (including <6 mo)  | 1,161              | NR        | NR              | Non-Hispanic-White: NR (54)<br>Non-Hispanic-Black or African American: NR (22)<br>Other: NR (3.7)<br><br>Non-Hispanic: NR (21)<br>Hispanic: NR   | NR                       | NR                                 | NR                  | NR                             |
| Guthrie, 2018 <sup>31</sup> | Overall | All lower income part (including <6 mo) | 641                | NR        | NR              | Non-Hispanic-White: NR (62)<br>Non-Hispanic-Black or African American: NR (19)<br>Other: NR (3.9)<br><br>Non-Hispanic: NR (15)<br>Hispanic: NR   | NR                       | NR                                 | NR                  | NR                             |
| Guthrie, 2018 <sup>31</sup> | Overall | All higher income part (including <6mo) | 1,427              | NR        | NR              | Non-Hispanic-White: NR (80)<br>Non-Hispanic-Black or African American: NR (5.4)<br>Other: NR (5.7)<br><br>Non-Hispanic: NR (9.1)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |



| Author, Year                | Arm   | Arm Name   | Number at Baseline | Sex, n(%)                     | Age of Children | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|-----------------------------|-------|--|--------------------|-------------------------------|-----------------|---|--------------------------|------------------------------------|---------------------|---|
| Hamner, 2019 <sup>32</sup>  | Arm 1 | Children currently receiving WIC benefits                    | 202                | NR                            | NR              | Non-Hispanic-Black or African American: 34 (16.6)<br>Non-Hispanic-White: 50 (24.6)<br>Other: 19 (9)<br><br>Non-Hispanic: 99 (49)<br>Hispanic: NR              | NR                       | 52 (73%)                           | NR                  | NR  |
| Hamner, 2019 <sup>32</sup>  | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | 84                 | NR                            | NR              | NR  | NR                       | NR                                 | NR                  | NR  |
| Hamner, 2019 <sup>32</sup>  | Arm 3 | Children not eligible to receive WIC benefits                | 132                | NR                            | NR              | NR  | NR                       | NR                                 | NR                  | NR  |
| Jackson, 2015 <sup>33</sup> |       | [Not an arm] ECLS - Eligible sample                          | 6120               | Boy: NR (50)<br>Girl: NR (50) | NR              | Non-Hispanic-White: NR (37)<br>Non-Hispanic-Black or African American: NR (20)<br>Asian: NR (2)<br>Other: NR (5)<br><br>Non-Hispanic: NR (36)<br>Hispanic: NR | NR                       | NR                                 | NR                  | # of siblings: 1;<br>Mom immigrant: 28%; Medicaid: 69%; Food stamps: 37%; TANF: 15%; Mother married: 47%; Avg cigarettes/d during last trimester: 1.05; Avg reading to child: 2.52 (scale 1 = not at all, 4 = every day); Ever breastfed: 62%; Low BW: 9% |

| Author, Year                | Arm     | Arm Name                                       | Number at Baseline | Sex, n(%)                     | Age of Children  | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|-----------------------------|---------|--|--------------------|-------------------------------|--|--|--------------------------|------------------------------------|---------------------|---|
| Jackson, 2015 <sup>33</sup> |         | ECLS Matching sample                           | 5323               | Boy: NR (50)<br>Girl: NR (50) | NR   | Non-Hispanic-White: NR (30)<br>Non-Hispanic-Black or African American: NR (20)<br>Asian: NR (7)<br>Other: NR (12)<br><br>Non-Hispanic: NR (28)<br>Hispanic: NR | NR                       | NR                                 | NR                  | # of siblings: 1.2; Mom immigrant: 25%; Medicaid: 69%; Food stamps: 38%; TANF: 14%; Mother married: 49%; Avg cigarettes/d during last trimester: 0.7; Avg reading to child: 2.64 (scale 1 = not at all, 4 = every day); Ever breastfed: 59%; Low BW: 9% |
| Jackson, 2015 <sup>33</sup> |         | [Not an arm] CDS-PSID - sibling varying sample | 263                | Boy: NR (50)<br>Girl: NR (50) | Mean (SD): 10.5 years (NR)<br>NR   | Non-Hispanic-White: NR (39)<br>Non-Hispanic-Black or African American: NR (14)<br>Other: NR (47)<br><br>Non-Hispanic: NR<br>Hispanic: NR                       | NR                       | NR                                 | NR                  | Mother married/birth year: 69%; Mother married/2002: 67%; other program participation: 20%; younger sibling: 45%; Mean read to child, 1997 (# days/wk): 4.18; Low BW: 6%; Ever breastfed 54%  |
| Jun, 2018 <sup>34</sup>     | Overall | Overall  | 3229               | NR                            | Range: 0-47.9 months<br>0-5.9: NR<br>6-11.9: 901 (NR)<br>12-23.9: 1132 (NR)<br>24-47.9: 596 (NR) | NR   | NR                       | NR                                 | NR                  | NR  |
| Kay, 2021 <sup>35</sup>     | Arm 1   | WIC  | 306                | NR                            | NR   | NR   | NR                       | NR                                 | NR                  | NR  |
| Kay, 2021 <sup>35</sup>     | Arm 2   | WIC Eligible                                   | 160                | NR                            | NR   | NR   | NR                       | NR                                 | NR                  | NR  |
| Kay, 2021 <sup>35</sup>     | Arm 3   | Non-WIC  | 409                | NR                            | NR   | NR   | NR                       | NR                                 | NR                  | NR  |

| Author, Year                   | Arm   | Arm Name                          | Number at Baseline | Sex, n(%) | Age of Children | Race/Ethnicity of Children, n (%) | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|--------------------------------|-------|-----------------------------------|--------------------|-----------|-----------------|-----------------------------------|--------------------------|------------------------------------|---------------------|--------------------------------|
| Lakshmanan, 2020 <sup>36</sup> | Arm 1 | Enrolled in WIC                   | 52                 | NR        | NR              | NR                                | NR                       | NR                                 | NR                  | NR                             |
| Lakshmanan, 2020 <sup>36</sup> | Arm 2 | Eligible, but not enrolled in WIC | 19                 | NR        | NR              | NR                                | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                   | Arm     | Arm Name         | Number at Baseline | Sex, n(%) | Age of Children | Race/Ethnicity of Children, n (%) | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|--------------------------------|---------|------------------|--------------------|-----------|-----------------|-----------------------------------|--------------------------|------------------------------------|---------------------|--|
| Lakshmanan, 2020 <sup>36</sup> | Overall | Eligible for WIC | 71                 | NR        | NR              | NR                                | NR                       | NR                                 | NR                  | 73% of eligible families were enrolled in WIC and 21% were enrolled in WIC/SNAP. 73% of participants were non-English speaking and 93% had an annual income less than \$40 000. The median (interquartile range [IQR]) birth weight and gestational age of the infants was 1168 g (654 g) and 28 weeks (4 weeks), respectively. Thirty-eight percent had a postdischarge diagnosis such as global developmental delay or cerebral palsy, and 24% used some sort of medical equipment such as supplemental oxygen, tracheostomy, a wheelchair, an adaptive stroller, or a feeding tube. |

| Author, Year                | Arm   | Arm Name                                | Number at Baseline | Sex, n(%)                   | Age of Children                      | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics                     |
|-----------------------------|-------|---|--------------------|-----------------------------|--------------------------------------|--|--------------------------|------------------------------------|---------------------|--|
| Li, 2019 <sup>37</sup>      | Arm 1 | Birth Year 2000-2008                    | 2770               | Boy: NR (52.45)<br>Girl: NR | Mean (SD): 28.54 (months) (17.44) NR | White: NR (25.31)<br>Black or African American: NR (22.2)<br>Other: NR (6.57)<br><br>Non-Hispanic: NR (9.49)<br>Hispanic: NR (36.43 (Mexican)) | NR                       | NR (82.64%)                        | NR                  | NR   |
| Li, 2019 <sup>37</sup>      | Arm 2 | Birth Year 2009-2014                    | 1538               | Boy: NR (49.54)<br>Girl: NR | Mean (SD): 19.74 (months) (15.97) NR | White: NR (22.63)<br>Black or African American: NR (27.63)<br>Other: NR (9.82)<br><br>Non-Hispanic: NR (13)<br>Hispanic: NR (26.92 (Mexican))  | NR                       | NR (87.13%)                        | NR                  | NR   |
| Oropesa, 2001 <sup>41</sup> | Arm 1 | Living in poverty, WIC non-participants | NR                 | NR                          | NR                                   | NR   | NR                       | 0%                                 | NR                  | N and baseline characteristics not really reported |
| Oropesa, 2001 <sup>41</sup> | Arm 2 | Living in poverty, WIC Participants     | NR                 | NR                          | NR                                   | NR   | NR                       | 100%                               | NR                  | N and baseline characteristics not really reported |
| Smock, 2020 <sup>43</sup>   | Arm 1 | 2-4 number WIC visits, overall          | varies             | NR                          | NR                                   | NR   | NR                       | NR                                 | NR                  | NR   |

| Author, Year               | Arm     | Arm Name                      | Number at Baseline | Sex, n(%)                           | Age of Children  | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|----------------------------|---------|-------------------------------|--------------------|-------------------------------------|--|---|--------------------------|------------------------------------|---------------------|--|
| Smock,2020 <sup>43</sup>   | Arm 2   | 5+ number WIC visits, overall | varies             | NR                                  | NR   | NR  | NR                       | NR                                 | NR                  | NR   |
| Smock,2020 <sup>43</sup>   | Overall | ≥ 2 WIC visits                | 779                | Boy: 401 (51.5)<br>Girl: 378 (48.5) | NR<br><12 mo: 106 (13.6)<br>12-23 mo: 191 (24.5)<br>24-35 mon: 206 (26.4)<br>36-47 mo: 189 (24.3)<br>47-55 mo: 87 (11.2) | NR  | NR                       | NR                                 | NR                  | NR   |
| Tester, 2016 <sup>45</sup> | Arm 1   | Non-WIC Participants          | 418                | Boy: 257 (56.2)<br>Girl: 221 (43.8) | Mean (SE): 3.07 (SE 0.05)<br>NR  | Non-Hispanic-White: 150 (51.3)<br>Non-Hispanic-Black or African American: 136 (21)<br>Other: 35 (5.9)<br><br>Non-Hispanic: 157 (21.8)<br>Hispanic: NR | NR                       | NR                                 | NR                  | food insecurity status, child weight status                                  |
| Thomas, 2014 <sup>46</sup> | Overall | Overall                       | 13183              | NR                                  | assessed immunization status at 24 months<br>NR  | NR  | NR                       | NR                                 | NR                  | Baseline characteristics not shown (but adjusted for in logistic regression) |

| Author, Year                  | Arm     | Arm Name                        | Number at Baseline | Sex, n(%)                           | Age of Children  | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|-------------------------------|---------|---------------------------------|--------------------|-------------------------------------|--|--|--------------------------|------------------------------------|---------------------|----------------------------------|
| Vercammen, 2018 <sup>47</sup> | Arm 1   | WIC Participants                | 677                | Boy: 333 (48.4)<br>Girl: 344 (51.6) | NR<br>24-35 months: 296 (38.5)<br>36-47 months: 192 (32.3)<br>48-60 months: 189 (29.3) | Non-Hispanic-White: 124 (27.1)<br>Non-Hispanic-Black or African American: 193 (24.1)<br>Other: 61 (7.8)<br><br>Non-Hispanic: 92 (13.3)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Mexican American n(%) 207 (27.7) |
| Vercammen, 2018 <sup>47</sup> | Arm 2   | Income-eligible nonparticipants | 409                | Boy: 216 (52.8)<br>Girl: 193 (47.2) | NR<br>24-35 months: 134 (29.7)<br>36-47 months: 124 (31)<br>48-60 months: 151 (39.3)   | Non-Hispanic-White: 131 (51.8)<br>Non-Hispanic-Black or African American: 117 (18.2)<br>Other: 45 (9)<br><br>Non-Hispanic: 43 (8.9)<br>Hispanic: NR    | NR                       | NR                                 | NR                  | Mexican American n(%) 73 (12.1)  |
| Vercammen, 2018 <sup>47</sup> | Arm 3   | Higher Income nonparticipants   | 490                | Boy: 252 (52.6)<br>Girl: 238 (47.4) | NR<br>24-35 months: 169 (29.6)<br>36-47 months: 158 (35.6)<br>48-60 months: 163 (34.8) | Non-Hispanic-White: 210 (71.9)<br>Non-Hispanic-Black or African American: 62 (5)<br>Other: 110 (11.5)<br><br>Non-Hispanic: 50 (5.4)<br>Hispanic: NR    | NR                       | NR                                 | NR                  | Mexican American n(%) 58 (6.1)   |
| Weinfield, 2020 <sup>49</sup> | Overall | Overall                         | 1349               | Boy: 696 (50.7)<br>Girl: 653 (49.3) | NR<br>24 months: 1349 (100)  | NR   | NR                       | NR                                 | NR                  | NR                               |
| Weinfield, 2020 <sup>48</sup> | Overall | Overall                         | 1223               | Boy: 634 (50.9)<br>Girl: 589 (49.1) | NR   | NR   | NR                       | 1223 (100%)                        | NR                  | NR                               |

| Author, Year               | Arm   | Arm Name                     | Number at Baseline | Sex, n(%)                           | Age of Children   | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|----------------------------|-------|------------------------------|--------------------|-------------------------------------|---|--|--------------------------|------------------------------------|---------------------|--------------------------------|
| Zimmer, 2020 <sup>50</sup> | Arm 1 | Higher income children       | 360                | Boy: 172 (49.9)<br>Girl: 188 (50.1) | NR<br>2 years old: 140 (31.1)<br>3 years old: 109 (36.8)<br>4 years old: 111 (32.1) | Non-Hispanic-White: 121 (69.3)<br>Non-Hispanic-Black or African American: 56 (6.5)<br>Other: 107 (11.9)<br><br>Non-Hispanic: 76 (12.3)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Zimmer, 2020 <sup>50</sup> | Arm 2 | WIC eligible nonparticipants | 224                | Boy: 110 (52.1)<br>Girl: 114 (47.9) | NR<br>2 years old: 73 (28.3)<br>3 years old: 71 (36.5)<br>4 years old: 80 (35.2)    | Non-Hispanic-White: 59 (53.6)<br>Non-Hispanic-Black or African American: 74 (17.6)<br>Other: 28 (6.1)<br><br>Non-Hispanic: 63 (22.6)<br>Hispanic: NR   | NR                       | NR                                 | NR                  | NR                             |
| Zimmer, 2020 <sup>50</sup> | Arm 3 | WIC Participants             | 463                | Boy: 231 (48.3)<br>Girl: 232 (51.7) | NR<br>2 years old: 211 (38.5)<br>3 years old: 132 (32.1)<br>4 years old: 120 (29.4) | Non-Hispanic-White: 64 (26.7)<br>Non-Hispanic-Black or African American: 152 (21.5)<br>Other: 45 (7.9)<br><br>Non-Hispanic: 202 (43.9)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |

CDS-PSID=Child Development Supplement-Panel Study of Income Dynamics; ECLS= Early Childhood Longitudinal Study; FPL=federal poverty level; n=sample size; NR=not reported; PRAMS=Pregnancy Risk Assessment Monitoring System; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-29. Infant and child characteristics of studies investigating the Key Question 2 association of the 2009 food package change with dietary and health outcomes**

| Author, Year                 | Arm   | Arm Name             | Number at Baseline | Sex, n(%)                       | Age of Children           | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|----------------------|--------------------|---------------------------------|---------------------------|--|--------------------------|------------------------------------|---------------------|---|
| Anderson, 2020 <sup>51</sup> | Arm 1 | Boys and old package | 43546              | Boy: 43546 (100)<br>Girl: 0 (0) | Range: 0 to 4 years<br>NR | Non-Hispanic-Asian: 1646 (3.79)<br>Non-Hispanic-Black or African American: 2003 (4.62)<br>Non-Hispanic-White: 1218 (2.81)<br>Other: 51 (0.12)<br><br>Non-Hispanic: 38473 (88.67)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language preference: English 13887; 31.89%; Spanish 28539, 65.54%; Other 1120, 2.57%. Initial WHZ mean and SD: 0.49, 1.51; Neighborhood characteristics: healthy outlets per sq mile, mean and SD: 3.33, 2.54; unhealthy outlets per sq mile, mean and SD: 9.97, 6.50; poverty %, mean and SD: 22.60, 11.18; minority percent, mean and SD, 89.56, 14.02; HS grad percent, mean and SD, 58.54, 15.74; residents per sq mile, mean and SD, 18,297, 11,910 |
| Anderson, 2020 <sup>51</sup> | Arm 2 | Boys and new package | 32195              | Boy: 32195 (100)<br>Girl: 0 (0) | Range: 0 to 4 years<br>NR | Non-Hispanic-Asian: 946 (2.94)<br>Non-Hispanic-  | NR                       | NR                                 | NR                  | Maternal language preference: English 15703,  |

| Author, Year                 | Arm   | Arm Name              | Number at Baseline | Sex, n(%)                       | Age of Children           | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|-----------------------|--------------------|---------------------------------|---------------------------|--|--------------------------|------------------------------------|---------------------|---|
|                              |       |                       |                    |                                 |                           | Black or African American: 1575 (4.89)<br>Non-Hispanic-White: 738 (2.29)<br>Other: 535 (1.66)<br><br>Non-Hispanic: 28396 (88.21)<br>Hispanic: NR |                          |                                    |                     | 48.77%; Spanish 15770, 48.98%; Other 722, 2.24%. Initial WHZ mean and SD: 0.37, 1.63; Neighborhood characteristics: healthy outlets per sq mile, mean and SD: 2.99, 2.39; unhealthy outlets per sq mile, mean and SD: 9.46, 5.73; poverty %, mean and SD: 25.93, 11.55; minority percent, mean and SD, 89.66, 13.73; HS grad percent, mean and SD, 62.04, 15.36; residents per sq mile, mean and SD, 17922, 11894 |
| Anderson, 2020 <sup>51</sup> | Arm 3 | Girls and old package | 41686              | Boy: 0 (0)<br>Girl: 41686 (100) | Range: 0 to 4 years<br>NR | Non-Hispanic-Asian: 1538 (3.7)<br>Non-Hispanic-Black or African American: 1857 (4.47)<br>Non-Hispanic-White: 1113 (2.68)                         | NR                       | NR                                 | NR                  | Maternal language preference: English 13431, 32.22%; Spanish 27279, 65.44%; Other 976, 2.34%. Initial WHZ mean and SD:  |

| Author, Year                 | Arm   | Arm Name              | Number at Baseline | Sex, n(%)                       | Age of Children           | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|-----------------------|--------------------|---------------------------------|---------------------------|---|--------------------------|------------------------------------|---------------------|---|
|                              |       |                       |                    |                                 |                           | Other: 46 (0.11)<br><br>Non-Hispanic: 36976 (89.03)<br>Hispanic: NR   |                          |                                    |                     | 0.47,1.86; Neighborhood characteristics: healthy outlets per sq mile, mean and SD:3.33,2.54; unhealthy outlets per sq mile, mean and SD: 9.97, 6.47; poverty %, mean and SD: 22.65,11.15; minority percent, mean and SD, 89.54, 14.01; HS grad percent, mean and SD, 58.52, 15.70; residents per sq mile, mean and SD, 18295, 11907 |
| Anderson, 2020 <sup>51</sup> | Arm 4 | Girls and new package | 31207              | Boy: 0 (0)<br>Girl: 31207 (100) | Range: 0 to 4 years<br>NR | Non-Hispanic-Asian: 903 (2.89)<br>Non-Hispanic-Black or African American: 1573 (5.04)<br>Non-Hispanic-White: 674 (2.16)<br>Other: 547 (1.75)<br><br>Non-Hispanic: 27504 (88.15)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language preference: English 15084, 50.9%; Spanish 15456, 49.53%; Other 667, 2.14%. Initial WHZ mean and SD: 0.37,1.52; Neighborhood characteristics: healthy outlets per sq mile, mean and SD: 2.97,2.39;   |

| Author, Year                 | Arm     | Arm Name                | Number at Baseline | Sex, n(%)                         | Age of Children | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|---------|-------------------------|--------------------|-----------------------------------|-----------------|--|--------------------------|------------------------------------|---------------------|---|
|                              |         |                         |                    |                                   |                 |  |                          |                                    |                     | unhealthy outlets per sq mile, mean and SD: 9.41, 5.69; poverty %, mean and SD: 25.92, 11.63; minority percent, mean and SD, 89.63, 13.84; HS grad percent, mean and SD, 62.07, 15.42; residents per sq mile, mean and SD, 17836, 11790 |
| Anderson, 2020 <sup>52</sup> | Overall | Overall                 | 260935             | Boy: NR (48.36-52.24)<br>Girl: NR | NR              | Non-Hispanic-Asian: NR (1.43-3.90)<br>Non-Hispanic-Black or African American: NR (2.83-5.80)<br>Non-Hispanic-White: NR (1.76-4.15)<br>Other: Other, n not reported (0.72-2.05)<br><br>Non-Hispanic: NR (86.73-91.14)<br>Hispanic: NR | NR                       | NR                                 |                     | Maternal Language, ranges: English 27.88-53.40; Spanish 43.71-70.68; Other 0.72-2.05  |
| Chaparro, 2019 <sup>57</sup> | Arm 1   | Full dose (old package) | 85871              | Boy: NR (51)<br>Girl: NR (49)     | NR              | Non-Hispanic-Asian: NR (3.8)<br>Non-Hispanic-Black or African American: NR   | NR                       | NR                                 | NR                  | Percent obese at final visit in 4th year, initial WHZ   |

| Author, Year                 | Arm   | Arm Name                | Number at Baseline | Sex, n(%)                         | Age of Children | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics                        |
|------------------------------|-------|-------------------------|--------------------|-----------------------------------|-----------------|--|--------------------------|------------------------------------|---------------------|---|
|                              |       |                         |                    |                                   |                 | (4.5)<br>Non-Hispanic-White: NR (2.9)<br>Other: NR (0.1)<br><br>Non-Hispanic: NR (88.8)<br>Hispanic: NR  |                          |                                    |                     |   |
| Chaparro, 2019 <sup>57</sup> | Arm 2 | Full dose (new package) | 70120              | Boy: NR (50.8)<br>Girl: NR (49.2) | NR              | Non-Hispanic-Asian: NR (3.2)<br>Non-Hispanic-Black or African American: NR (4.7)<br>Non-Hispanic-White: NR (2.4)<br>Other: NR (1.5)<br><br>Non-Hispanic: NR (88.2)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Percent obese at final visit in 4th year, initial WHZ |
| Chaparro, 2019 <sup>57</sup> | Arm 3 | Late dose (old package) | 18241              | Boy: NR (50.8)<br>Girl: NR (49.2) | NR              | Non-Hispanic-Asian: NR (4.9)<br>Non-Hispanic-Black or African American: NR (6.7)<br>Non-Hispanic-White: NR (4.2)<br>Other: NR (0.9)<br><br>Non-Hispanic: NR (83.4)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Percent obese at final visit in 4th year, initial WHZ |
| Chaparro, 2019 <sup>57</sup> | Arm 4 | Late dose (new package) | 8386               | Boy: NR (50.3)<br>Girl: NR (49.7) | NR              | Non-Hispanic-Asian: NR (6.2)<br>Non-Hispanic-Black or African American: NR (9.7)   | NR                       | NR                                 | NR                  | Percent obese at final visit in 4th year, initial WHZ |

| Author, Year                 | Arm     | Arm Name              | Number at Baseline | Sex, n(%)                         | Age of Children                              | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics                        |
|------------------------------|---------|-----------------------|--------------------|-----------------------------------|--|---|--------------------------|------------------------------------|---------------------|---|
|                              |         |                       |                    |                                   |  | Non-Hispanic-White: NR (6.5)<br>Other: NR (3.4)<br><br>Non-Hispanic: NR (74.1)<br>Hispanic: NR  |                          |                                    |                     |   |
| Chaparro, 2019 <sup>57</sup> | Overall | Overall               | 182618             | Boy: NR (50.9)<br>Girl: NR (49.1) | NR   | Non-Hispanic-Asian: NR (3.8)<br>Non-Hispanic-Black or African American: NR (5.1)<br>Non-Hispanic-White: NR (3)<br>Other: NR (0.9)<br><br>Non-Hispanic: NR (87.3)<br>Hispanic: NR                                | NR                       | NR                                 | NR                  | Percent obese at final visit in 4th year, initial WHZ |
| Chaparro, 2019 <sup>58</sup> | Arm 1   | Low WHZ (old package) | 12461              | Boy: 6362 (NR)<br>Girl: 6099 (NR) | Mean (SD): 1.88 to 2.22 (2.47 to 2.59)<br>NR | Non-Hispanic-Asian: 113 to 121 (1.9)<br>Non-Hispanic-Black or African American: 282 to 292 (4.6)<br>Non-Hispanic-White: 95 to 116 (1.6 to 1.8)<br><br>Non-Hispanic: 5609 to 5833 (91.7 to 92.0)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Initial WHZ, family poverty, obese at last visit      |
| Chaparro, 2019 <sup>58</sup> | Arm 2   | Low WHZ (new package) | 12461              | Boy: 6362 (NR)<br>Girl:           | Mean (SD): 1.89 to 2.22 (2.49 to             | Non-Hispanic-Asian: 113 to 121 (1.9)<br>Non-Hispanic-Black or African   | NR                       | NR                                 | NR                  | Initial WHZ, family poverty, obese at last visit      |

| Author, Year                 | Arm   | Arm Name                  | Number at Baseline | Sex, n(%)                           | Age of Children                           | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics                   |
|------------------------------|-------|---------------------------|--------------------|-------------------------------------|---|--|--------------------------|------------------------------------|---------------------|--|
|                              |       |                           |                    | 6099 (NR)                           | 2.62) NR                                  | American: 282 to 292 (4.6)<br>Non-Hispanic-White: 95 to 116 (1.6 to 1.8)<br><br>Non-Hispanic: 5609 to 5833 (91.7 to 92.0)<br>Hispanic: NR  |                          |                                    |                     |  |
| Chaparro, 2019 <sup>58</sup> | Arm 3 | Average WHZ (old package) | 27697              | Boy: 13960 (NR)<br>Girl: 13737 (NR) | Mean (SD): 3.08 to 3.12 (2.74 to 2.76) NR | Non-Hispanic-Asian: 295 to 313 (2.1 to 2.3)<br>Non-Hispanic-Black or African American: 493 to 514 (3.6 to 3.7)<br>Non-Hispanic-White: 192 to 199 (1.4 to 1.5)<br><br>Non-Hispanic: 12732 to 12959 (92.7 to 92.8)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Initial WHZ, family poverty, obese at last visit |
| Chaparro, 2019 <sup>58</sup> | Arm 4 | Average WHZ(new package)  | 27697              | Boy: 13960 (NR)<br>Girl: 13737 (NR) | Mean (SD): 3.11 to 3.14 (2.76 to 2.79) NR | Non-Hispanic-Asian: 295 to 313 (2.1 to 2.3)<br>Non-Hispanic-Black or African American: 493 to 514 (3.6 to 3.7)<br>Non-Hispanic-White: 192 to 199 (1.4 to 1.5)<br><br>Non-Hispanic: 12732 to 12959                                | NR                       | NR                                 | NR                  | Initial WHZ, family poverty, obese at last visit |

| Author, Year                 | Arm   | Arm Name                           | Number at Baseline | Sex, n(%)                         | Age of Children                              | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|------------------------------|-------|------------------------------------|--------------------|-----------------------------------|--|--|--------------------------|------------------------------------|---------------------|--|
|                              |       |                                    |                    |                                   |  | (92.7 to 92.8)<br>Hispanic: NR   |                          |                                    |                     |  |
| Chaparro, 2019 <sup>58</sup> | Arm 5 | High WHZ (old package)             | 12917              | Boy: 6531 (NR)<br>Girl: 6386 (NR) | Mean (SD): 3.50 to 3.94 (2.62 to 2.72)<br>NR | Non-Hispanic-Asian: 56 to 69 (0.9 to 1.1)<br>Non-Hispanic-Black or African American: 150 to 178 (2.4 to 2.7)<br>Non-Hispanic-White: 43 to 62 (0.7 to 1)<br><br>Non-Hispanic: 6137 to 6219 (95.2 to 96.1)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Initial WHZ, family poverty, obese at last visit                                   |
| Chaparro, 2019 <sup>58</sup> | Arm 6 | High WHZ (new package)             | 12917              | Boy: 6531 (NR)<br>Girl: 6386 (NR) | Mean (SD): 3.57 to 4.04 (2.63 to 2.73)<br>NR | Non-Hispanic-Asian: 56 to 69 (0.9 to 1.1)<br>Non-Hispanic-Black or African American: 150 to 178 (2.4 to 2.7)<br>Non-Hispanic-White: 43 to 62 (0.7 to 1)<br><br>Non-Hispanic: 6137 to 6219 (95.2 to 96.1)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Initial WHZ, family poverty, obese at last visit                                   |
| Chaparro, 2020 <sup>59</sup> | Arm 1 | 0 years receiving new food package | boys: 11089        | Boy: 11089 (100)<br>Girl: NR      | Range: birth to 4 years<br>NR                | Non-Hispanic-Asian: boys: 722 (6.5)<br>Non-Hispanic-Black or African American: boys:   | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; boys: mean: 0.29, SD, 0.22; Parental |



| Author, Year                 | Arm   | Arm Name                                  | Number at Baseline | Sex, n(%)                    | Age of Children               | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|------------------------------|-------|---|--------------------|------------------------------|-------------------------------|--|--------------------------|------------------------------------|---------------------|--|
|                              |       |   |                    |                              |                               | 741 (6.7)<br>Non-Hispanic-White: boys: 376 (3.4)<br>Other: boys: 12 (0.1)<br><br>Non-Hispanic: boys: 9238 (83.3)<br>Hispanic: NR   |                          |                                    |                     | language; boys: English n=4582;41.3%; Spanish n=5977;53.9%; Other n=530;4.8%.  |
| Chaparro, 2020 <sup>59</sup> | Arm 1 | 0 years receiving new food package        | girls: 10552       | Boy: NR<br>Girl: 10552 (100) | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: girls: 673 (6.4)<br>Non-Hispanic-Black or African American: girls: 666 (6.3)<br>Non-Hispanic-White: girls: 381 (3.6)<br>Other: girls: 12 (0.1)<br><br>Non-Hispanic: girls: 8820 (83.6)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; girls: mean: 0.29, SD, 0.22; Parental language; girls: English n=4401;41.7%; Spanish n=5684;53.9%; Other n=467;4.4%. |
| Chaparro, 2020 <sup>59</sup> | Arm 2 | >0 and <1 year receiving new food package | boys: 4361         | Boy: 4361 (100)<br>Girl: NR  | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: boys: 223 (5.1)<br>Non-Hispanic-Black or African American: boys: 245 (5.6)<br>Non-Hispanic-White: boys: 134 (3.1)<br>Other: boys: 27 (0.6)   | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; boys: mean: 0.23, SD, 0.23; Parental language; boys: English n=1919, 44.0%; Spanish n=2261;51.9%; Other n=181;4.2%.  |

| Author, Year                 | Arm   | Arm Name                                  | Number at Baseline | Sex, n(%)                   | Age of Children               | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|---|--------------------|-----------------------------|-------------------------------|--|--------------------------|------------------------------------|---------------------|---|
|                              |       |   |                    |                             |                               | Non-Hispanic: boys: 3732 (85.6)<br>Hispanic: NR  |                          |                                    |                     |   |
| Chaparro, 2020 <sup>59</sup> | Arm 2 | >0 and <1 year receiving new food package | girls: 4167        | Boy: NR<br>Girl: 4167 (100) | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: girls: 214 (5.1)<br>Non-Hispanic-Black or African American: girls: 273 (6.6)<br>Non-Hispanic-White: girls: 109 (2.6)<br>Other: girls: 15 (0.4)<br><br>Non-Hispanic: girls: 3556 (85.3)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; girls: mean: 0.24, SD, 0.23; Parental language; girls: English n=1890, 45.4%; Spanish n=2125, 51.0%; Other n=152, 3.7%. |
| Chaparro, 2020 <sup>59</sup> | Arm 3 | 1 to <2 years receiving new food package  | boys: 4138         | Boy: 4138 (100)<br>Girl: NR | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: boys: 192 (4.6)<br>Non-Hispanic-Black or African American: boys: 226 (5.5)<br>Non-Hispanic-White: boys: 92 (2)<br>Other: boys: 16 (0.4)<br><br>Non-Hispanic: boys: 3622 (87.5)<br>Hispanic: NR         | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; boys: mean: 0.25, SD, 0.23; Parental language; boys: English n=1915, 46.3%; Spanish n=2089, 50.5%; Other n=134, 3.2%.   |

| Author, Year                 | Arm   | Arm Name                                 | Number at Baseline | Sex, n(%)                   | Age of Children               | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|--|--------------------|-----------------------------|-------------------------------|---|--------------------------|------------------------------------|---------------------|---|
| Chaparro, 2020 <sup>59</sup> | Arm 3 | 1 to <2 years receiving new food package | girls: 3979        | Boy: NR<br>Girl: 3979 (100) | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: girls: 173 (4.4)<br>Non-Hispanic-Black or African American: girls: 220 (5.5)<br>Non-Hispanic-White: girls: 88 (2.2)<br>Other: girls: 26 (0.7)<br><br>Non-Hispanic: girls: 3472 (87.3)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; girls: mean: 0.25, SD, 0.23; Parental language; girls: English n=1891, 47.5%; Spanish n=1961, 49.3%; Other n=127, 3.2%. |
| Chaparro, 2020 <sup>59</sup> | Arm 4 | 2 to <3 years receiving new food package | boys: 4436         | Boy: 4436 (100)<br>Girl: NR | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: boys: 186 (4.2)<br>Non-Hispanic-Black or African American: boys: 278 (6.3)<br>Non-Hispanic-White: boys: 101 (2.3)<br>Other: boys: 40 (0.9)<br><br>Non-Hispanic: boys: 3831 (86.4)<br>Hispanic: NR     | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; boys: mean: 0.25, SD, 0.24; Parental language; boys: English n=2220, 50.1%; Spanish n=2096, 47.3%; Other n=120, 2.7%.   |
| Chaparro, 2020 <sup>59</sup> | Arm 4 | 2 to <3 years receiving new food package | girls: 4262        | Boy: NR<br>Girl: 4262 (100) | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: girls: 185 (4.3)<br>Non-Hispanic-Black or African American: girls:  | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; girls: mean: 0.25, SD, 0.24; Parental   |

| Author, Year                 | Arm   | Arm Name                                 | Number at Baseline | Sex, n(%)                   | Age of Children               | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|--|--------------------|-----------------------------|-------------------------------|---|--------------------------|------------------------------------|---------------------|---|
|                              |       |  |                    |                             |                               | 275 (6.5)<br>Non-Hispanic-White: girls: 101 (2.4)<br>Other: girls: 21 (0.5)<br><br>Non-Hispanic: girls: 3680 (86.3)<br>Hispanic: NR   |                          |                                    |                     | language; girls: English n=2053, 48.2%; Spanish n=2082,48.9%; Other n=127,3.0%.   |
| Chaparro, 2020 <sup>59</sup> | Arm 5 | 4 to <4 years receiving new food package | boys: 4679         | Boy: 4679 (100)<br>Girl: NR | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: boys: 176 (3.8)<br>Non-Hispanic-Black or African American: boys: 328 (7)<br>Non-Hispanic-White: boys: 102 (2.2)<br>Other: boys: 43 (0.9)<br><br>Non-Hispanic: boys: 4030 (86.1)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; boys: mean: 0.26, SD, 0.24; Parental language; boys: English n=2451, 52.4%; Spanish n=2103,45.0%; Other n=125,2.7%.   |
| Chaparro, 2020 <sup>59</sup> | Arm 5 | 4 to <4 years receiving new food package | girls: 4508        | Boy: NR<br>Girl: 4508 (100) | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: girls: 179 (4)<br>Non-Hispanic-Black or African American: girls: 279 (6.2)<br>Non-Hispanic-White: girls: 94 (2.1)<br>Other: girls: 46 (1)   | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; girls: mean: 0.26, SD, 0.24; Parental language; girls: English n=2378, 52.8%; Spanish n=2025,44.9%; Other n=105,2.3%. |

| Author, Year                 | Arm   | Arm Name                           | Number at Baseline | Sex, n(%)                   | Age of Children               | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|------------------------------------|--------------------|-----------------------------|-------------------------------|---|--------------------------|------------------------------------|---------------------|---|
|                              |       |                                    |                    |                             |                               | Non-Hispanic: girls: 3910 (86.7)<br>Hispanic: NR  |                          |                                    |                     |   |
| Chaparro, 2020 <sup>59</sup> | Arm 6 | 4 years receiving new food package | boys: 9706         | Boy: 9706 (100)<br>Girl: NR | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: boys: 381 (3.9)<br>Non-Hispanic-Black or African American: boys: 695 (7.2)<br>Non-Hispanic-White: boys: 223 (2.3)<br>Other: boys: 154 (1.6)<br><br>Non-Hispanic: boys: 8253 (85)<br>Hispanic: NR      | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; boys: mean: 0.22, SD, 0.23; Parental language; boys: English n=5529, 57.0%; Spanish n=3921, 40.4%; Other n=256, 2.6%.   |
| Chaparro, 2020 <sup>59</sup> | Arm 6 | 4 years receiving new food package | girls: 8994        | Boy: NR<br>Girl: 8994 (100) | Range: birth to 4 years<br>NR | Non-Hispanic-Asian: girls: 356 (4)<br>Non-Hispanic-Black or African American: girls: 683 (7.6)<br>Non-Hispanic-White: girls: 199 (2.2)<br>Other: girls: 154 (1.7)<br><br>Non-Hispanic: girls: 7602 (84.5)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Mean age (years) and SD at initial WHZ value; girls: mean: 0.22, SD, 0.23; Parental language; girls: English n=5141, 57.2%; Spanish n=3175, 35.3%; Other n=243, 2.7%. |
| Chaparro, 2020 <sup>60</sup> | Arm 1 | Fully breastfeed,                  | 3037               | Boy: 4332                   | Mean (SD): 0.21               | Non-Hispanic-Asian: 0 (0)   | NR                       | NR                                 | NR                  | NR  |

| Author, Year                 | Arm    | Arm Name                          | Number at Baseline | Sex, n(%)                           | Age of Children                      | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|------------------------------|--------|-----------------------------------|--------------------|-------------------------------------|--------------------------------------|---|--------------------------|------------------------------------|---------------------|--------------------------------|
|                              |        | old package only                  |                    | (NR)<br>Girl: 4797 (NR)             | (0.22)<br>NR                         | Non-Hispanic-Black or African American: 1 to 5 (0.1 to 0.4)<br>Non-Hispanic-White: 4 to 6 (0.3 to 0.4)<br>Other: 0 (0)<br><br>Non-Hispanic: 1435 to 1592 (99.4 to 99.6)<br>Hispanic: NR   |                          |                                    |                     |                                |
| Chaparro, 2020 <sup>60</sup> | Arm 10 | Fully formula, old package only   | 10464              | Boy: 17868 (NR)<br>Girl: 16650 (NR) | Mean (SD): 0.24 to 0.25 (0.23)<br>NR | Non-Hispanic-Asian: 45 to 51 (0.8 to 0.9)<br>Non-Hispanic-Black or African American: 233 to 243 (4.1 to 4.2)<br>Non-Hispanic-White: 16 to 20 (0.3)<br>Other: 1 to 3 (0.0 to 0.1)<br><br>Non-Hispanic: 5255 to 5639 (94.7)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Chaparro, 2020 <sup>60</sup> | Arm 11 | Fully formula, mixed package only | 10464              | Boy: 17868 (NR)<br>Girl: 16650 (NR) | Mean (SD): 0.24 to 0.25 (0.23)<br>NR | Non-Hispanic-Asian: 45 to 51 (0.8 to 0.9)<br>Non-Hispanic-Black or African American: 233 to 243 (4.1 to 4.2)<br>Non-Hispanic-   | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                 | Arm    | Arm Name                             | Number at Baseline | Sex, n(%)                           | Age of Children                      | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|------------------------------|--------|--------------------------------------|--------------------|-------------------------------------|--------------------------------------|---|--------------------------|------------------------------------|---------------------|--------------------------------|
|                              |        |                                      |                    |                                     |                                      | White: 16 to 20 (0.3)<br>Other: 1 to 3 (0.0 to 0.1)<br><br>Non-Hispanic: 5255 to 5639 (94.7)<br>Hispanic: NR  |                          |                                    |                     |                                |
| Chaparro, 2020 <sup>60</sup> | Arm 12 | Fully formula, new package only      | 10464              | Boy: 17868 (NR)<br>Girl: 16650 (NR) | Mean (SD): 0.24 to 0.25 (0.23)<br>NR | Non-Hispanic-Asian: 45 to 51 (0.8 to 0.9)<br>Non-Hispanic-Black or African American: 233 to 243 (4.1 to 4.2)<br>Non-Hispanic-White: 16 to 20 (0.3)<br>Other: 1 to 3 (0.0 to 0.1)<br><br>Non-Hispanic: 5255 to 5639 (94.7)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Chaparro, 2020 <sup>60</sup> | Arm 2  | Fully breastfeed, mixed package only | 3037               | Boy: 4332 (NR)<br>Girl: 4797 (NR)   | Mean (SD): 0.21 (0.22)<br>NR         | Non-Hispanic-Asian: 0 (0)<br>Non-Hispanic-Black or African American: 1 to 5 (0.1 to 0.4)<br>Non-Hispanic-White: 4 to 6 (0.3 to 0.4)<br>Other: 0 (0)<br><br>Non-Hispanic: 1435 to 1592   | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                 | Arm   | Arm Name                              | Number at Baseline | Sex, n(%)                           | Age of Children                      | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|------------------------------|-------|---------------------------------------|--------------------|-------------------------------------|--------------------------------------|--|--------------------------|------------------------------------|---------------------|--------------------------------|
|                              |       |                                       |                    |                                     |                                      | (99.4 to 99.6)<br>Hispanic: NR   |                          |                                    |                     |                                |
| Chaparro, 2020 <sup>60</sup> | Arm 3 | Fully breastfeed, new package only    | 3037               | Boy: 4332 (NR)<br>Girl: 4797 (NR)   | Mean (SD): 0.21 (0.22)<br>NR         | Non-Hispanic-Asian: 0 (0)<br>Non-Hispanic-Black or African American: 1 to 5 (0.1 to 0.4)<br>Non-Hispanic-White: 4 to 6 (0.3 to 0.4)<br>Other: 0 (0)<br><br>Non-Hispanic: 1435 to 1592 (99.4 to 99.6)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Chaparro, 2020 <sup>60</sup> | Arm 4 | Mostly breastfeed, old package only   | 8284               | Boy: 12345 (NR)<br>Girl: 12519 (NR) | Mean (SD): 0.24 to 0.25 (0.23)<br>NR | Non-Hispanic-Asian: 13 (0.3)<br>Non-Hispanic-Black or African American: 28 to 30 (0.7)<br>Non-Hispanic-White: 5 to 6 (0.1)<br>Other: 0 to 1 (0)<br><br>Non-Hispanic: 4066 to 4126 (98.8 to 98.9)<br>Hispanic: NR     | NR                       | NR                                 | NR                  | NR                             |
| Chaparro, 2020 <sup>60</sup> | Arm 5 | Mostly breastfeed, mixed package only | 8284               | Boy: 12345 (NR)<br>Girl: 12519 (NR) | Mean (SD): 0.24 to 0.25 (0.23)<br>NR | Non-Hispanic-Asian: 13 (0.3)<br>Non-Hispanic-Black or African American: 28 to 30 (0.7)<br>Non-Hispanic-White: 5 to 6   | NR                       | NR                                 | NR                  | NR                             |



| Author, Year                 | Arm   | Arm Name                            | Number at Baseline | Sex, n(%)                           | Age of Children                      | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|------------------------------|-------|-------------------------------------|--------------------|-------------------------------------|--------------------------------------|---|--------------------------|------------------------------------|---------------------|--------------------------------|
|                              |       |                                     |                    |                                     |                                      | (0.1)<br>Other: 0 to 1 (0)<br><br>Non-Hispanic: 4066 to 4126 (98.8 to 98.9)<br>Hispanic: NR   |                          |                                    |                     |                                |
| Chaparro, 2020 <sup>60</sup> | Arm 6 | Mostly breastfeed, new package only | 8284               | Boy: 12345 (NR)<br>Girl: 12519 (NR) | Mean (SD): 0.24 to 0.25 (0.23)<br>NR | Non-Hispanic-Asian: 13 (0.3)<br>Non-Hispanic-Black or African American: 28 to 30 (0.7)<br>Non-Hispanic-White: 5 to 6 (0.1)<br>Other: 0 to 1 (0)<br><br>Non-Hispanic: 4066 to 4126 (98.8 to 98.9)<br>Hispanic: NR                          | NR                       | NR                                 | NR                  | NR                             |
| Chaparro, 2020 <sup>60</sup> | Arm 7 | Mostly formula, old package only    | 16146              | Boy: 25230 (NR)<br>Girl: 23250 (NR) | Mean (SD): 0.29 (0.23)<br>NR         | Non-Hispanic-Asian: 30 to 40 (0.4 to 0.5)<br>Non-Hispanic-Black or African American: 86 to 130 (1.1 to 1.6)<br>Non-Hispanic-White: 14 to 21 (0.2 to 0.3)<br>Other: 0 (0)<br><br>Non-Hispanic: 7613 to 8226 (97.8 to 98.2)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Chaparro, 2020 <sup>60</sup> | Arm 8 | Mostly formula,                     | 16146              | Boy: 25230                          | Mean (SD): 0.29                      | Non-Hispanic-Asian: 30 to 40  | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                 | Arm   | Arm Name                                      | Number at Baseline | Sex, n(%)                           | Age of Children              | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|------------------------------|-------|---|--------------------|-------------------------------------|------------------------------|---|--------------------------|------------------------------------|---------------------|--|
|                              |       | mixed package only                            |                    | (NR)<br>Girl: 23250 (NR)            | (0.23)<br>NR                 | (0.4 to 0.5)<br>Non-Hispanic-Black or African American: 86 to 130 (1.1 to 1.6)<br>Non-Hispanic-White: 14 to 21 (0.2 to 0.3)<br>Other: 0 (0)<br><br>Non-Hispanic: 7613 to 8226 (97.8 to 98.2)<br>Hispanic: NR                              |                          |                                    |                     |  |
| Chaparro, 2020 <sup>60</sup> | Arm 9 | Mostly formula, new package only              | 16146              | Boy: 25230 (NR)<br>Girl: 23250 (NR) | Mean (SD): 0.29 (0.23)<br>NR | Non-Hispanic-Asian: 30 to 40 (0.4 to 0.5)<br>Non-Hispanic-Black or African American: 86 to 130 (1.1 to 1.6)<br>Non-Hispanic-White: 14 to 21 (0.2 to 0.3)<br>Other: 0 (0)<br><br>Non-Hispanic: 7613 to 8226 (97.8 to 98.2)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR   |
| Chaparro, 2020 <sup>61</sup> | Arm 1 | Very low income (<50% FPL), boys, old package | 5433               | Boy: 5433 (100)<br>Girl: 0 (0)      | NR                           | Non-Hispanic-Asian: 63 (1.2)<br>Non-Hispanic-Black or African American: 478 (8.8)<br>Non-Hispanic-White: 103 (1.9)<br><br>Non-Hispanic:   | NR                       | NR                                 | NR                  | Maternal language: English 2722, 50.1%; Spanish 2678, 49.3%; Other 33, 0.6%.<br>Neighborhood-level Characteristics: Percentage |

| Author, Year                 | Arm   | Arm Name                                      | Number at Baseline | Sex, n(%)                      | Age of Children | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|---|--------------------|--------------------------------|-----------------|---|--------------------------|------------------------------------|---------------------|---|
|                              |       |   |                    |                                |                 | 4785 (88.1)<br>Hispanic: NR   |                          |                                    |                     | poverty: <20%: 2156,39.7%; 20-40%: 2766, 50.9%; >40%: 511, 9.4%.<br>Percentage high school grads: <20%: 9,0.2%; 20-40%: 732,13.5%; >40%: 4692,86.4%.<br>Percentage non-white: <20%: 7,0.1%; 20-40%: 53,1.0%; >40%: 5373, 98.9%.   |
| Chaparro, 2020 <sup>61</sup> | Arm 2 | Very low income (<50% FPL), boys, new package | 5433               | Boy: 5433 (100)<br>Girl: 0 (0) | NR              | Non-Hispanic-Asian: 63 (1.2)<br>Non-Hispanic-Black or African American: 478 (8.8)<br>Non-Hispanic-White: 103 (1.9)<br><br>Non-Hispanic: 4785 (88.1)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language: English 2722, 50.1%; Spanish 2678, 49.3%; Other 33, 0.6%.<br>Neighborhood-level Characteristics: Percentage poverty: <20%: 1517,27.9%; 20-40%: 3093, 56.9%; >40%: 823, 15.2%.<br>Percentage high school grads: <20%: 2,0.0%; 20-40%: 496,9.1%; >40%: 4935,90.8%. |

| Author, Year                 | Arm   | Arm Name                                       | Number at Baseline | Sex, n(%)                      | Age of Children | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|--|--------------------|--------------------------------|-----------------|--|--------------------------|------------------------------------|---------------------|---|
|                              |       |  |                    |                                |                 |  |                          |                                    |                     | Percentage non-white: <20%: 3,0.1%; 20-40%: 47,0.9%; >40%: 5383, 99.1%.   |
| Chaparro, 2020 <sup>61</sup> | Arm 3 | Very low income (<50% FPL), girls, old package | 5294               | Boy: 0 (0)<br>Girl: 5294 (100) | NR              | Non-Hispanic-Asian: 78 (1.5)<br>Non-Hispanic-Black or African American: 467 (8.8)<br>Non-Hispanic-White: 83 (1.6)<br><br>Non-Hispanic: 1663 (88.1)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language: English 2634, 49.8%; Spanish 2618, 49.5%; Other 42, 0.8%.<br>Neighborhood-level Characteristics: Percentage poverty: <20%: 2091,39.5%; 20-40%: 2687,50.8%; >40%: 516, 9.8%.<br>Percentage high school grads: <20%: 8,0.2%; 20-40%: 788,14.9%; >40%: 4498,85.0%.<br>Percentage non-white: <20%: 4,0.1%; 20-40%: 44,0.8%; >40%: 5246, 99.1%. |
| Chaparro, 2020 <sup>61</sup> | Arm 4 | Very low income (<50% FPL), girls,             | 5294               | Boy: 0 (0)<br>Girl: 5294 (100) | NR              | Non-Hispanic-Asian: 78 (1.5)<br>Non-Hispanic-Black or African American: 467  | NR                       | NR                                 | NR                  | Maternal language: English 2634, 49.8%; Spanish 2618, 49.5%;  |

| Author, Year                 | Arm   | Arm Name                                    | Number at Baseline | Sex, n(%)                       | Age of Children | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|---|--------------------|---------------------------------|-----------------|--|--------------------------|------------------------------------|---------------------|---|
|                              |       | new package                                 |                    |                                 |                 | (8.8)<br>Non-Hispanic-White: 83 (1.6)<br><br>Non-Hispanic: 4663 (88.1)<br>Hispanic: NR   |                          |                                    |                     | Other 42, 0.8%.<br>Neighborhood-level<br>Characteristics:<br>Percentage poverty: <20%: 1431, 27.0%; 20-40%: 3005, 56.8%; >40%: 858, 16.2%.<br>Percentage high school grads: <20%: 1, 0.0%; 20-40%: 495, 9.4%; >40%: 4798, 90.6%.<br>Percentage non-white: <20%: 4, 0.1%; 20-40%: 31, 0.6%; >40%: 5259, 99.3%. |
| Chaparro, 2020 <sup>61</sup> | Arm 5 | Low income (50-100% FPL), boys, old package | 10520              | Boy: 10520 (100)<br>Girl: 0 (0) | NR              | Non-Hispanic-Asian: 243 (2.3)<br>Non-Hispanic-Black or African American: 272 (2.6)<br>Non-Hispanic-White: 172 (1.6)<br><br>Non-Hispanic: 9823 (93.4)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language: English 3268, 31.1%; Spanish 7103, 67.5%; Other 149, 1.4%.<br>Neighborhood-level<br>Characteristics:<br>Percentage poverty: <20%: 4372, 41.6%; 20-40%: 5394, 51.3%; >40%: 754, 7.2%.<br>Percentage high  |

| Author, Year                 | Arm   | Arm Name                                    | Number at Baseline | Sex, n(%)                       | Age of Children | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|------------------------------|-------|---|--------------------|---------------------------------|-----------------|--|--------------------------|------------------------------------|---------------------|--|
|                              |       |   |                    |                                 |                 |  |                          |                                    |                     | school grads:<br><20%: 20,0.2%;<br>20-40%:<br>1412,13.4%;<br>>40%:<br>9088,86.4%.<br>Percentage<br>non-white:<br><20%: 22,0.2%;<br>20-40%:<br>135,1.3%;<br>>40%: 10363,<br>98.5%.  |
| Chaparro, 2020 <sup>61</sup> | Arm 6 | Low income (50-100% FPL), boys, new package | 10520              | Boy: 10520 (100)<br>Girl: 0 (0) | NR              | Non-Hispanic-Asian: 243 (2.3)<br>Non-Hispanic-Black or African American: 272 (2.6)<br>Non-Hispanic-White: 172 (1.6)<br><br>Non-Hispanic: 9823 (93.4)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language:<br>English 3268, 31.1%; Spanish 7103, 67.5%;<br>Other 149, 1.4%.<br>Neighborhood-level Characteristics:<br>Percentage poverty: <20%: 3040,28.9%;<br>20-40%: 6135, 58.3%; >40%: 1345, 12.8%.<br>Percentage high school grads:<br><20%: 0,0.0%;<br>20-40%:<br>941,8.9%;<br>>40%:<br>9579,91.1%.<br>Percentage non-white:<br><20%: 2,0.02%;<br>20-40%: |

| Author, Year                 | Arm   | Arm Name                                     | Number at Baseline | Sex, n(%)                       | Age of Children | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|------------------------------|-------|--|--------------------|---------------------------------|-----------------|--|--------------------------|------------------------------------|---------------------|--|
|                              |       |  |                    |                                 |                 |  |                          |                                    |                     | 139,1.3%; >40%: 10379, 98.7%.  |
| Chaparro, 2020 <sup>61</sup> | Arm 7 | Low income (50-100% FPL), girls, old package | 10206              | Boy: 0 (0)<br>Girl: 10206 (100) | NR              | Non-Hispanic-Asian: 229 (2.2)<br>Non-Hispanic-Black or African American: 269 (2.6)<br>Non-Hispanic-White: 168 (1.7)<br><br>Non-Hispanic: 9533 (93.4)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language: English 3219, 31.5%; Spanish 6854, 67.2%; Other 133, 1.3%.<br>Neighborhood-level Characteristics: Percentage poverty: <20%: 4370,42.8%; 20-40%: 5079, 46.8%; >40%: 757, 7.4%.<br>Percentage high school grads: <20%: 23,0.3%; 20-40%: 1360,13.3%; >40%: 8820,86.4%.<br>Percentage non-white: <20%: 15,0.2%; 20-40%: 123,1.2%; >40%: 10065, 98.6%. |
| Chaparro, 2020 <sup>61</sup> | Arm 8 | Low income (50-100% FPL), girls, new package | 10206              | Boy: 0 (0)<br>Girl: 10206 (100) | NR              | Non-Hispanic-Asian: 229 (2.2)<br>Non-Hispanic-Black or African American: 269 (2.6)<br>Non-Hispanic-  | NR                       | NR                                 | NR                  | Maternal language: English 3219, 31.5%; Spanish 6854, 67.2%; Other 133, 1.3%.  |

| Author, Year                 | Arm   | Arm Name  | Number at Baseline | Sex, n(%)                      | Age of Children | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|-------|---|--------------------|--------------------------------|-----------------|---|--------------------------|------------------------------------|---------------------|---|
|                              |       |   |                    |                                |                 | White: 168 (1.7)<br><br>Non-Hispanic: 9533 (93.4)<br>Hispanic: NR   |                          |                                    |                     | Neighborhood-level Characteristics: Percentage poverty: <20%: 2949, 28.9%; 20-40%: 5914, 58.0%; >40%: 1343, 13.2%. Percentage high school grads: <20%: 2, 0.0%; 20-40%: 989, 9.7%; >40%: 9215, 90.3%. Percentage non-white: <20%: 6, 0.1%; 20-40%: 129, 1.3%; >40%: 10071, 98.7%. |
| Chaparro, 2020 <sup>61</sup> | Arm 9 | Above poverty (>100% to <185% FPL), boys, old package | 4177               | Boy: 4177 (100)<br>Girl: 0 (0) | NR              | Non-Hispanic-Asian: 189 (4.5)<br>Non-Hispanic-Black or African American: 94 (2.3)<br>Non-Hispanic-White: 108 (2.6)<br><br>Non-Hispanic: 3783 (90.6)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language: English 2098, 50.2%; Spanish 1994, 47.7%; Other 85, 2.0%. Neighborhood-level Characteristics: Percentage poverty: <20%: 2203, 52.7%; 20-40%: 1777, 42.5%; >40%: 197, 4.7%. Percentage high school grads: <20%: 9, 0.2%;  |



| Author, Year                 | Arm    | Arm Name  | Number at Baseline | Sex, n(%)                      | Age of Children | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|------------------------------|--------|---|--------------------|--------------------------------|-----------------|---|--------------------------|------------------------------------|---------------------|--|
|                              |        |   |                    |                                |                 |   |                          |                                    |                     | 20-40%: 392,9.4%; >40%: 3776,90.4%. Percentage non-white: <20%: 18,0.4%; 20-40%: 70,1.7%; >40%: 4089,97.9% 99.1%.  |
| Chaparro, 2020 <sup>61</sup> | Arm 10 | Above poverty (>100% to <185% FPL), boys, new package | 4177               | Boy: 4177 (100)<br>Girl: 0 (0) | NR              | Non-Hispanic-Asian: 189 (4.5)<br>Non-Hispanic-Black or African American: 94 (2.3)<br>Non-Hispanic-White: 108 (2.6)<br><br>Non-Hispanic: 3783 (90.6)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language: English 2098, 50.2%; Spanish 1994, 47.7%; Other 85, 2.0%. Neighborhood-level Characteristics: Percentage poverty: <20%: 1651,39.5%; 20-40%: 2209, 52.9%; >40%: 317, 7.6%. Percentage high school grads: <20%: 1,0.0%; 20-40%: 246,5.9%; >40%: 3930,94.1%. Percentage non-white: <20%: 6,0.1%; 20-40%: 69,1.7%; >40%: 4102, 98.2%. |

| Author, Year                 | Arm    | Arm Name   | Number at Baseline | Sex, n(%)                      | Age of Children | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|--------|--|--------------------|--------------------------------|-----------------|---|--------------------------|------------------------------------|---------------------|---|
| Chaparro, 2020 <sup>61</sup> | Arm 11 | Above poverty (>100% to <185% FPL), girls, old package | 4121               | Boy: 0 (0)<br>Girl: 4121 (100) | NR              | Non-Hispanic-Asian: 180 (4.4)<br>Non-Hispanic-Black or African American: 98 (2.4)<br>Non-Hispanic-White: 105 (2.6)<br><br>Non-Hispanic: 3738 (90.7)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language: English 1949, 47.3%; Spanish 2099, 50.9%; Other 73, 1.8%. Neighborhood-level Characteristics: Percentage poverty: <20%: 2090, 50.7%; 20-40%: 1886, 45.8%; >40%: 145, 3.5%. Percentage high school grads: <20%: 7, 0.2%; 20-40%: 425, 10.3%; >40%: 3689, 89.5%. Percentage non-white: <20%: 8, 0.2%; 20-40%: 61, 1.5%; >40%: 4052, 98.3%. |
| Chaparro, 2020 <sup>61</sup> | Arm 12 | Above poverty (>100% to <185% FPL), girls, new package | 4121               | Boy: 0 (0)<br>Girl: 4121 (100) | NR              | Non-Hispanic-Asian: 180 (4.4)<br>Non-Hispanic-Black or African American: 98 (2.4)<br>Non-Hispanic-White: 105 (2.6)<br><br>Non-Hispanic: 3738 (90.7)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Maternal language: English 1949, 47.3%; Spanish 2099, 50.9%; Other 73, 1.8%. Neighborhood-level Characteristics: Percentage poverty: <20%: 1681, 40.8%;   |

| Author, Year                 | Arm     | Arm Name | Number at Baseline   | Sex, n(%)                           | Age of Children        | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|------------------------------|---------|----------|--|-------------------------------------|------------------------|--|--------------------------|------------------------------------|---------------------|---|
|                              |         |          |  |                                     |                        |  |                          |                                    |                     | 20-40%: 2116, 51.4%; >40%: 324, 7.9%.<br>Percentage high school grads: <20%: 0,0.0%; 20-40%: 266,6.5%; >40%: 3855,93.4%.<br>Percentage non-white: <20%: 6,0.2%; 20-40%: 83,2.0%; >40%: 4032, 97.8%. |
| Chiasson, 2016 <sup>62</sup> | Overall | Overall  | 140510   | Boy: 71697 (51)<br>Girl: 68813 (49) | NR                     | Non-Hispanic-Black or African American: 36743 (26.1)<br>Non-Hispanic-White: 38818 (27.6)<br>Non-Hispanic-Asian: 11327 (8.1)<br>Other: 3234 (2.3)<br><br>Non-Hispanic: 50388 (35.9)<br>Hispanic: NR | NR                       | NR                                 | NR                  | Birthweight (<500g/1500-2500g,2500-3999g,4000g), breastfeeding package (none/partial/full )   |
| Daepp, 2019 <sup>63</sup>    | Overall |          | 2000: 2253471;<br>2004: 2550533;<br>2008: 2790527;<br>2010: 3206995; | NR                                  | Range: 2-4 years<br>NR | Non-Hispanic - American Indian/Alaska Native: NR<br>(2000: 3.14;<br>2004 : 3.27;<br>2008: 3.62;<br>2010: 3.50;   | NR                       | NR                                 | NR                  | % children with high birth weight (> 4 kg): 2000: 13.22; 2004: 7.17; 2008: 6.49; 2010: 6.62; 2012: 6.43; 2014:  |

| Author, Year | Arm | Arm Name | Number at Baseline              | Sex, n(%) | Age of Children | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|--------------|-----|----------|---------------------------------|-----------|-----------------|---|--------------------------|------------------------------------|---------------------|--|
|              |     |          | 2012: 3152137;<br>2014: 2915253 |           |                 | 2012: 3.63;<br>2014: 3.56)<br>Non-Hispanic-Black or African American: NR (2000: 21.29; 2004: 19.82; 2008: 19.37; 2010: 19.19; 2012: 19.95; 2014: 20.75)<br>Non-Hispanic-White: NR (2000: 52.79; 2004: 49.44; 2008: 44.72; 2010: 43.79; 2012: 42.70; 2014: 41.67)<br>Other: Non-Hispanic Asian American or Pacific Islander (2000: 2.1; 2004: 2.25; 2008: 2.35; 2010: 2.61; 2012: 2.94; 2014: 3.37)<br><br>Non-Hispanic: NR (2000: 20.67; 2004: 25.22; 2008: 29.94; 2010: 30.91; 2012: 30.79; 2014: 30.65)<br>Hispanic: NR |                          |                                    |                     | 6.41; % of WIC participating women with high prepregnancy BMI (BMI $\geq 29.1$ ): 2000: 21.95; 2004: 26.22; 2008: 28.55; 2010: 29.96; 2012: 30.66; 2014: 32.22 |

| Author, Year                 | Arm   | Arm Name                | Number at Baseline | Sex, n(%)                         | Age of Children             | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|------------------------------|-------|-------------------------|--------------------|-----------------------------------|-----------------------------|---|--------------------------|------------------------------------|---------------------|--------------------------------|
| Freedman, 2017 <sup>64</sup> | Arm 1 | WIC-PC Survey year 2000 | 1847324            | Boy: NR (50.6)<br>Girl: NR (49.4) | Mean (SD): 13.7 months (NR) | White: NR (38.3)<br>Black or African American: NR (21.1)<br>Asian: NR (3.5)<br>American Indian/Alaska Native: NR (0.9)<br>Other: NR (0.8)<br><br>Non-Hispanic: NR (35.4)<br>Hispanic: NR (64.6) | NR                       | NR                                 | NR                  | NR                             |
| Freedman, 2017 <sup>64</sup> | Arm 2 | WIC-PC Survey year 2004 | 2018235            | Boy: NR (50.3)<br>Girl: NR (49.7) | Mean (SD): 13.6 months (NR) | White: NR (35.3)<br>Black or African American: NR (19.4)<br>Asian: NR (3.4)<br>American Indian/Alaska Native: NR (1)<br>Other: NR (1.2)<br><br>Non-Hispanic: NR (39.7)<br>Hispanic: NR (60.3)   | NR                       | NR                                 | NR                  | NR                             |
| Freedman, 2017 <sup>64</sup> | Arm 3 | WIC-PC Survey year 2010 | 2319712            | Boy: NR (50.7)<br>Girl: NR (49.3) | Mean (SD): 14.2 months (NR) | White: NR (32.3)<br>Black or African American: NR (20)<br>Asian: NR (3.8)<br>American Indian/Alaska Native: NR (1.2)<br>Other: NR (0.9)   | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                 | Arm   | Arm Name                | Number at Baseline | Sex, n(%)                         | Age of Children   | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|------------------------------|-------|-------------------------|--------------------|-----------------------------------|---|---|--------------------------|------------------------------------|---------------------|--------------------------------|
|                              |       |                         |                    |                                   |   | Non-Hispanic: NR (41.8)<br>Hispanic: NR (58.2)  |                          |                                    |                     |                                |
| Freedman, 2017 <sup>64</sup> | Arm 4 | WIC-PC Survey year 2014 | 2340611            | Boy: NR (50.8)<br>Girl: NR (49.2) | Mean (SD): 13.5 months (NR)                                 | White: NR (31.2)<br>Black or African American: NR (21.5)<br>Asian: NR (4.5)<br>American Indian/Alaska Native: NR (1.2)<br>Other: NR (0.1)<br><br>Non-Hispanic: NR (41.4)<br>Hispanic: NR (58.6) | NR                       | NR                                 | NR                  | NR                             |
| Guthrie, 2020 <sup>65</sup>  | Arm 1 | 2008 non-WIC            | 2213               | NR                                | 6-11.9: 349 (NR)<br>12-23.9: 686 (NR)<br>24-47.9: 1178 (NR) | NR  | NR                       | NR                                 | NR                  | NR                             |
| Guthrie, 2020 <sup>65</sup>  | Arm 2 | 2008 WIC                | 679                | NR                                | 6-11.9: 160 (NR)<br>12-23.9: 238 (NR)<br>24-47.9: 281 (NR)  | NR  | NR                       | NR                                 | NR                  | NR                             |
| Guthrie, 2020 <sup>65</sup>  | Arm 3 | 2016 non-WIC            | 1719               | NR                                | 6-11.9: 527 (NR)<br>12-23.9: 753 (NR)                       | NR  | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                | Arm   | Arm Name  | Number at Baseline | Sex, n(%)                  | Age of Children  | Race/Ethnicity of Children, n (%) | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|-----------------------------|-------|-----------|--------------------|----------------------------|--|-----------------------------------|--------------------------|------------------------------------|---------------------|---|
|                             |       |           |                    |                            | 24-47.9: 439 (NR)  |                                   |                          |                                    |                     |   |
| Guthrie, 2020 <sup>65</sup> | Arm 4 | 2016 WIC  | 916                | NR                         | 6-11.9: 375 (NR)<br>12-23.9: 380 (NR)<br>24-47.9: 161 (NR) | NR                                | NR                       | NR                                 | NR                  | NR  |
| Ishdorj, 2013 <sup>66</sup> | Arm 1 | Pre-2009  | 766                | Boy: NR<br>Girl: NR (48.7) | NR<br>2: NR (40.2)<br>3: NR (34.9)<br>4: NR (24.9)         | NR                                | NR                       | NR                                 | NR                  |   |
| Ishdorj, 2013 <sup>66</sup> | Arm 2 | Post-2009 | 876                | Boy: NR<br>Girl: NR (48.4) | NR<br>2: NR (39.5)<br>3: NR (34.9)<br>4: NR (25.6)         | NR                                | NR                       | NR                                 | NR                  |   |
| Kong, 2014 <sup>19</sup>    | Arm 1 | Hispanic  | 112                | Boy: NR<br>Girl: 50 (53)   | Mean (SD): 52 months (5.8 months)<br>NR                    | NR                                | NR                       | NR                                 | NR                  | Married/living with partner: 90 (80%); acculturation score < 3: 89 (79%); interviewed in spanish: 87 (78%); 1-2 children in household: 54 (48); > 2 children in household: 58 (52%); # adults in household = 1: 11 (10%); # |

| Author, Year             | Arm   | Arm Name         | Number at Baseline | Sex, n(%)                | Age of Children                           | Race/Ethnicity of Children, n (%) | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|--------------------------|-------|------------------|--------------------|--------------------------|---|-----------------------------------|--------------------------|------------------------------------|---------------------|--|
|                          |       |                  |                    |                          |   |                                   |                          |                                    |                     | adults in household $\geq$ 2: 101 (90%); F&V voucher = \$6: 57 (51%); F&V voucher > \$6: 55 (49%); SNAP or other cash assistance in last 6 months: 90 (80%); CHILDB: BMI $\geq$ 85th percentile: 47 (53%)  |
| Kong, 2014 <sup>19</sup> | Arm 2 | African American | 97                 | Boy: NR<br>Girl: 37 (53) | Mean (SD): 52.8 months (5.3 months)<br>NR | NR                                | NR                       | NR                                 | NR                  | Married/living with partner: 21 (22%); 1-2 children in household: 52 (54%); > 2 children in household: 45 (46%); # adults in household = 1: 37 (38%); # adults in household $\geq$ 2: 60 (62%); F&V voucher = \$6: 50 (52%); F&V voucher > \$6: 47 (48%); SNAP or other cash assistance in last 6 months: 90 (93%); CHILDB: BMI $\geq$ 85th percentile: 19 (30%) |



| Author, Year                   | Arm   | Arm Name                        | Number at Baseline | Sex, n(%)                         | Age of Children                                 | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|--------------------------------|-------|---------------------------------|--------------------|-----------------------------------|---|---|--------------------------|------------------------------------|---------------------|---|
| Langellier, 2014 <sup>68</sup> | Arm 1 | Pre-food package change - 2005  | 1772               | Boy: NR (51.2)<br>Girl: NR (48.8) | Mean: 9.5 (months)<br>(95% CI: 9.3, 9.8)<br>NR  | NR  | NR                       | NR                                 | NR                  | Interview Language (% Spanish); Maternal nativity; Father living in household |
| Langellier, 2014 <sup>68</sup> | Arm 1 | Pre-food package change - 2008  | 1598               | Boy: NR (49.1)<br>Girl: NR (50.9) | Mean: 9.7 (months)<br>(95% CI: 9.4, 10.0)<br>NR | NR  | NR                       | NR                                 | NR                  | Interview Language (% Spanish); Maternal nativity; Father living in household |
| Langellier, 2014 <sup>68</sup> | Arm 2 | Post-food package change - 2011 | 1650               | Boy: NR (49.8)<br>Girl: NR (50.2) | Mean: 8.6 (months)<br>(95% CI: 8.4, 8.9)<br>NR  | NR  | NR                       | NR                                 | NR                  | Interview Language (% Spanish); Maternal nativity; Father living in household |
| Lee, 2017 <sup>69</sup>        | Arm 1 | 2002                            | 122852             | NR                                | NR  | White: NR (24.5)<br>Black or African American: NR (26.9)<br>Asian: NR (7.5)<br>Other: NR (8.1)<br><br>Non-Hispanic: 0.33 (NR)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR  |
| Lee, 2017 <sup>69</sup>        | Arm 2 | 2010                            | 125779             | NR                                | NR  | White: NR (27.4)<br>Black or African American: NR (24.7)<br>Asian: NR (8.3)<br>Other: NR (3.5)  | NR                       | NR                                 | NR                  | NR  |

| Author, Year                | Arm   | Arm Name | Number at Baseline | Sex, n(%) | Age of Children  | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|-----------------------------|-------|----------|--------------------|-----------|--|---|--------------------------|------------------------------------|---------------------|--|
|                             |       |          |                    |           |  | Non-Hispanic: 0.361 (NR)<br>Hispanic: NR  |                          |                                    |                     |  |
| Lee, 2017 <sup>69</sup>     | Arm 3 | 2015     | 113806             | NR        | NR   | White: NR (26.9)<br>Black or African American: NR (23.5)<br>Asian: NR (10.5)<br>Other: NR (3)<br><br>Non-Hispanic: 0.361 (NR)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR   |
| Meiqari, 2015 <sup>70</sup> | Arm 1 | Child    | 46                 | NR        | NR<br>2 years (24 months): 13 (28.3)<br>3 years (36 months): 21 (45.7)<br>4 years (48 months): 12 (26.1) | NR  | NR                       | NR                                 | NR                  | # of children in the home: One (8; 17.4%); Two (19; 41.3%); three (10; 21.7%); four (4; 8.7%); five or more (5; 10.9%); Milk consumed by child: low-fat (19; 41.3%); whole (27; 58.7%); Milk consumed by mother: low fat (16; 42.1%); whole milk (22; 57.9%); Preferred milk for the family: low fat (23; 57.5%); whole milk (17; 42.5%); Mother |

| Author, Year                | Arm   | Arm Name | Number at Baseline | Sex, n(%) | Age of Children   | Race/Ethnicity of Children, n (%) | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|-----------------------------|-------|----------|--------------------|-----------|---|-----------------------------------|--------------------------|------------------------------------|---------------------|---|
|                             |       |          |                    |           |   |                                   |                          |                                    |                     | was breastfeeding (3; 6.5%); Mother received education about low fat milk at WIC (36; 80%); Number of children receiving WIC services: one (21; 45.7%); two (21; 45.7%); three (3; 6.5%); four or more (1, 2.2%); Changed regular grocery store during follow-up (6; 15%)                 |
| Meiqari, 2015 <sup>70</sup> | Arm 2 | Mother   | 38                 | NR        | NR<br>2 years (24 months): 12 (31.6)<br>3 years (36 months): 17 (44.7)<br>4 years (48 months): 9 (23.7) | NR                                | NR                       | NR                                 | NR                  | # of children in the home: One (8; 21%); Two (15; 39.5%); three (9; 23.7%); four (4; 10.5%); five or more (2; 5.3%); Milk consumed by child: low-fat (22; 61.1%); whole (14; 38.9%); Milk consumed by mother: low fat (16; 42.1%); whole milk (22; 57.9%); Preferred milk for the family: |

| Author, Year                | Arm   | Arm Name  | Number at Baseline | Sex, n(%)                  | Age of Children                            | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics  |
|-----------------------------|-------|-----------|--------------------|----------------------------|--|--|--------------------------|------------------------------------|---------------------|---|
|                             |       |           |                    |                            |  |  |                          |                                    |                     | low fat (19; 55.9%); whole milk (15; 44.1%); Mother was breastfeeding (1; 2.6%); Mother received education about low fat milk at WIC (28; 75.5%); Number of children receiving WIC services: one (19; 50%); two (16; 42.1%); three (2; 5.3%); four or more (1, 2.6%); Changed regular grocery store during follow-up (7; 20.6%) |
| Morshed, 2015 <sup>71</sup> | Arm 1 | Fall 2008 | 74                 | Boy: NR<br>Girl: NR (48.7) | Mean (SD): 43.4 months (4.67 months)<br>NR | White: NR (59.5)<br>American Indian/Alaska Native: NR (32.4)<br>Asian: NR (2.7)<br>More than one: NR (5.4)<br><br>Non-Hispanic: NR (56.8)<br>Hispanic: NR (43.2) | NR                       | NR                                 | NR                  | Language of interview: English (90.5%), Spanish (9.5%) / BMI: < 5th%ile (12.2%); between 5-85th%ile (66.2%); between 85-95th%ile (5.4%); ≥ 95th%ile (16.2%); relationship of  |

| Author, Year                | Arm   | Arm Name    | Number at Baseline | Sex, n(%)                     | Age of Children  | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|-----------------------------|-------|-------------|--------------------|-------------------------------|--|--|--------------------------|------------------------------------|---------------------|--|
|                             |       |             |                    |                               |  |  |                          |                                    |                     | respondent to child [detailed greatly in table 1; shortened here]: mother (78.4%)  |
| Morshed, 2015 <sup>71</sup> | Arm 2 | Spring 2010 | 88                 | Boy: NR<br>Girl: NR (50)      | Mean (SD): 53.9 months (6.92 months)<br>NR                                       | White: NR (48.9)<br>American Indian/Alaska Native: NR (44.3)<br>Asian: NR (0)<br>More than one: NR (6.8)<br><br>Non-Hispanic: NR (53.4)<br>Hispanic: NR (46.6) | NR                       | NR                                 | NR                  | Language of interview: English (93.2%), Spanish (6.8%) / BMI: < 5th%ile (3%); between 5-85th%ile (58%); between 85-95th%ile (16%); ≥ 95th%ile (11%); relationship of respondent to child [detailed greatly in table 1; shortened here]: mother (71.6%) |
| Morshed, 2015 <sup>71</sup> | Arm 2 | 2011        | 120                | Boy: 58 (48)<br>Girl: 61 (50) | NR<br>4-5.9 months: 26 (22)<br>6-11.9 months: 54 (45)<br>12-23.9 months: 40 (33) | Non-Hispanic-White: 18 (15)<br>Other: 13 (20)<br><br>Non-Hispanic: 78 (65)<br>Hispanic: NR   | NR                       | NR                                 | NR                  | Completed second recall: 58 (48%); weight of child: young infants 16lb (SE 1), older infants 20lb (SE 1), toddlers 23lb (SE 0); breastfeeding status: initiated 107 (89%), breastfed to 4 mo: 70 (58%),  |

| Author, Year                    | Arm     | Arm Name   | Number at Baseline | Sex, n(%)                | Age of Children           | Race/Ethnicity of Children, n (%)                | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location  | Other baseline characteristics  |
|---------------------------------|---------|--|--------------------|--------------------------|---------------------------|--|--------------------------|------------------------------------|--|---|
|                                 |         |  |                    |                          |                           |  |                          |                                    |  | currently 4-5.9mo: 14 (56%), currently 6-11.9mo: 16 (30%), currently 12-23.9mo: 4 (10%); supplement usage: 11 (9%)  |
| Odoms-Young, 2014 <sup>72</sup> | Overall | Hispanic (demographics stratified by race/ethnicity) | 143                | Boy: NR<br>Girl: NR (50) | Mean (SD): 32.9 (6)<br>NR | NR<br><br>Non-Hispanic: 143 (NR)<br>Hispanic: NR | NR                       | NR                                 | Urban: 143 (100)<br>Suburban: NR<br>Rural: NR<br>Mixed: NR | Education : mean (SD), 11.0 y (2.4); married/living with partner (n (%): 106 (75%); owns homes: n(%): 14 (10%); SNAP in last 6 mo, n(%): 104 (73%); Born is US, n(%): 37 (26%); Food security, n (%), high/marginal: 62(43), low: 61(43), very low: 21 (1.3); child BMI 17.4 (2.1), BMIZ .8 (1.2) underweight (< 5th P) (3%), normal (5th-85th) (57%), overweight (85th-95th) (18%), obese (> 95th) (22%) |

| Author, Year                    | Arm     | Arm Name   | Number at Baseline | Sex, n(%)                                   | Age of Children                         | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location  | Other baseline characteristics   |
|---------------------------------|---------|--|--------------------|---|---|--|--------------------------|------------------------------------|--|--|
| Odoms-Young, 2014 <sup>72</sup> | Overall | African American (demographics strategies by race/ethnicity) | 120                | Boy: NR<br>Girl: NR (48)                    | Mean (SD): 33.1 (5.6)<br>NR             | Black or African American: 130 (NR)<br><br>Non-Hispanic: NR<br>Hispanic: NR  | NR                       | NR                                 | Urban: 130 (100)<br>Suburban: NR<br>Rural: NR<br>Mixed: NR | Education : mean (SD), 12.3y (1.7); married/living with partner (n (%): 24 (18%); owns homes: n(%): 6 (5%); SNAP in last 6 mo, n(%): 104 (73%); Food security, n (%), high/marginal: 75(58), low: 39(430), very low: 16 (12); BMI 16.8 (1.7), BMIZ 0.4 (1.3), underweight (< 5th p) (6%), normal (5th-85%th) (62%), overweight (85th-95th) (15%), obese (> 95th) (17%) |
| Pan, 2016 <sup>73, 74</sup>     | Arm 1   | 2000 Child WIC participants                                  | 2352648            | NR  | NR<br>24: NR<br>36: NR<br>48: NR        | NR   | NR                       | NR                                 | NR   | NR   |
| Pan, 2016 <sup>73, 74</sup>     | Arm 2   | 2004 Child WIC participants                                  | 2648564            | NR  | NR<br>24: NR<br>36: NR<br>48: NR        | NR   | NR                       | NR                                 | NR   | NR   |
| Pan, 2016 <sup>73, 74</sup>     | Arm 3   | 2010 Child WIC participants                                  | 3307442            | Boy: 1676395 (50.7)<br>Girl: 1631047 (49.3) | NR<br>24: 1333334 (40.3)<br>36: 1166350 | Non-Hispanic-White: 966673 (29.5)<br>Non-Hispanic-Black or African American: | NR                       | NR                                 | NR   | NR   |

| Author, Year                | Arm   | Arm Name                    | Number at Baseline | Sex, n(%)                                   | Age of Children   | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|-----------------------------|-------|-----------------------------|--------------------|---|---|---|--------------------------|------------------------------------|---------------------|--------------------------------|
|                             |       |                             |                    |   | (35.3)<br>48:<br>807758<br>(24.4)                                 | 618580 (18.8)<br>Non-Hispanic - American<br>Indian/Alaska Native: 38661 (1.2)<br>Non-Hispanic-Asian: 121667 (3.7)<br><br>Non-Hispanic: 1536644 (46.8)<br>Hispanic: NR   |                          |                                    |                     |                                |
| Pan, 2016 <sup>73, 74</sup> | Arm 4 | 2012 Child WIC participants | 3261106            | Boy: 1654510 (50.7)<br>Girl: 1606596 (49.3) | NR<br>24: 1268827 (38.9)<br>36: 1173931 (36)<br>48: 818348 (25.1) | Non-Hispanic-White: 919697 (28.4)<br>Non-Hispanic-Black or African American: 634965 (19.6)<br>Non-Hispanic - American Indian/Alaska Native: 40814 (1.3)<br>Non-Hispanic-Asian: 130252 (4)<br><br>Non-Hispanic: 1513145 (46.7)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Pan, 2016 <sup>73, 74</sup> | Arm 5 | 2014 Child WIC participants | 3016487            | Boy: 1532467 (50.8)<br>Girl: 1484020 (49.2) | NR<br>24: 1198411 (39.7)<br>36: 1106205 (36.7)<br>48:             | Non-Hispanic-White: 841132 (27.9)<br>Non-Hispanic-Black or African American: 615395 (20.4)<br>Non-Hispanic -  | NR                       | NR                                 | NR                  | NR                             |



| Author, Year                | Arm   | Arm Name                    | Number at Baseline | Sex, n(%)                                   | Age of Children  | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|-----------------------------|-------|-----------------------------|--------------------|---|--|---|--------------------------|------------------------------------|---------------------|--------------------------------|
|                             |       |                             |                    |   | 711871 (23.6)  | American Indian/Alaska Native: 36456 (1.2)<br>Non-Hispanic-Asian: 129770 (4.3)<br><br>Non-Hispanic: 1389135 (46.1)<br>Hispanic: NR  |                          |                                    |                     |                                |
| Pan, 2016 <sup>73, 74</sup> | Arm 6 | 2016 Child WIC participants | 2818594            | Boy: 1431197 (50.8)<br>Girl: 1387397 (49.2) | NR<br>24: 1152176 (40.9)<br>36: 1027505 (36.4)<br>48: 638913 (22.7)              | Non-Hispanic-White: 776843 (27.6)<br>Non-Hispanic-Black or African American: 594060 (21.1)<br>Non-Hispanic - American Indian/Alaska Native: 35682 (1.3)<br>Non-Hispanic-Asian: 136141 (4.8)<br><br>Non-Hispanic: 1274650 (45.2)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Pan, 2021 <sup>75</sup>     | Arm 1 | WIC-PC Survey year 2010     | 2319712            | Boy: 1176994 (50.7)<br>Girl: 1142718 (49.3) | 3-5 years old: 189045 (8.1)<br>6-11 years old: 525316 (22.6)<br>12-17 years old: | Non-Hispanic-White: 748889 (32.6)<br>Non-Hispanic-Black or African American: 464419 (20.2)<br>Asian: 88591 (3.9)<br>American  | NR                       | NR                                 | NR                  | NR                             |

| Author, Year            | Arm   | Arm Name                | Number at Baseline | Sex, n(%)                                   | Age of Children   | Race/Ethnicity of Children, n (%)   | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|-------------------------|-------|-------------------------|--------------------|---|---|---|--------------------------|------------------------------------|---------------------|--------------------------------|
|                         |       |                         |                    |   | 868676 (37.4)<br>18-23 years old: 736675 (31.8)   | Indian/Alaska Native: 27183 (1.2)<br>Non-Hispanic: 970555 (42.2)<br>Hispanic: NR  |                          |                                    |                     |                                |
| Pan, 2021 <sup>75</sup> | Arm 2 | WIC-PC Survey year 2012 | 2277422            | Boy: 1158070 (50.9)<br>Girl: 1119352 (49.1) | 3-5 years old: 178192 (7.8)<br>6-11 years old: 529782 (23.3)<br>12-17 years old: 883792 (388)<br>18-23 years old: 685656 (30.1) | Non-Hispanic-White: 719133 (31.8)<br>Non-Hispanic-Black or African American: 469092 (20.8)<br>Asian: 94925 (4.2)<br>American Indian/Alaska Native: 28308 (1.3)<br>Non-Hispanic: 948891 (42)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Pan, 2021 <sup>75</sup> | Arm 3 | WIC-PC Survey year 2014 | 2340611            | Boy: 1190132 (50.8)<br>Girl: 1150479 (49.2) | 3-5 years old: 187354 (8)<br>6-11 years old: 620714 (26.5)<br>12-17 years old: 988285 (42.2)<br>18-23 years old: 544258 (23.3)  | Non-Hispanic-White: 730586 (31.3)<br>Non-Hispanic-Black or African American: 503362 (21.5)<br>Asian: 105288 (4.5)<br>American Indian/Alaska Native: 29030 (1.2)<br>Non-Hispanic:                            | NR                       | NR                                 | NR                  | NR                             |

| Author, Year               | Arm   | Arm Name                | Number at Baseline | Sex, n(%)                                   | Age of Children  | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|----------------------------|-------|-------------------------|--------------------|---|--|--|--------------------------|------------------------------------|---------------------|--------------------------------|
|                            |       |                         |                    |   |  | 968864 (41.5)<br>Hispanic: NR  |                          |                                    |                     |                                |
| Pan, 2021 <sup>75</sup>    | Arm 4 | WIC-PC Survey year 2016 | 2345567            | Boy: 1192499 (50.8)<br>Girl: 1153068 (49.2) | 3-5 years old: 210888 (9)<br>6-11 years old: 640996 (27.3)<br>12-17 years old: 966233 (41.2)<br>18-23 years old: 527450 (22.5) | Non-Hispanic-White: 702650 (30)<br>Non-Hispanic-Black or African American: 523183 (22.3)<br>Asian: 107581 (4.6)<br>American Indian/Alaska Native: 28741 (1.2)<br><br>Non-Hispanic: 982069 (41.9)<br>Hispanic: NR | NR                       | NR                                 | NR                  | NR                             |
| Pan, 2021 <sup>75</sup>    | Arm 5 | WIC-PC Survey year 2018 | 2083443            | Boy: 1062371 (51)<br>Girl: 1021072 (49)     | 3-5 years old: 203908 (9.8)<br>6-11 years old: 583767 (28)<br>12-17 years old: 838373 (40.2)<br>18-23 years old: 457395 (22)   | Non-Hispanic-White: 616781 (29.6)<br>Non-Hispanic-Black or African American: 485675 (23.3)<br>Asian: 99708 (4.8)<br>American Indian/Alaska Native: 26407 (1.3)<br><br>Non-Hispanic: 853982 (41)<br>Hispanic: NR  | NR                       | NR                                 | NR                  | NR                             |
| Tester, 2016 <sup>45</sup> | Arm 2 | WIC participants        | 719                | Boy: 364 (48.3)<br>Girl: 355 (51.7)         | Mean (SE): 2.91 (SE 0.04)<br>NR  | Non-Hispanic-White: 130 (30.4)<br>Non-Hispanic-  | NR                       | NR                                 | NR                  | NR                             |

| Author, Year                 | Arm   | Arm Name   | Number at Baseline | Sex, n(%)                     | Age of Children  | Race/Ethnicity of Children, n (%)  | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics   |
|------------------------------|-------|--|--------------------|-------------------------------|--|--|--------------------------|------------------------------------|---------------------|--|
|                              |       |  |                    |                               |  | Black or African American: 194 (22.4)<br>Other: 43 (7.3)<br><br>Non-Hispanic: 352 (39.9)<br>Hispanic: NR |                          |                                    |                     |  |
| Thornton, 2014 <sup>76</sup> | Arm 1 | 2009   | 84                 | Boy: 45 (54)<br>Girl: 37 (44) | NR<br>4-5.9 months: 17 (20)<br>6-11.9 months: 33 (39)<br>12-23.9 months: 34 (41) | Non-Hispanic-White: 14 (17)<br>Other: 10 (12)<br><br>Non-Hispanic: 57 (68)<br>Hispanic: NR               | NR                       | NR                                 | NR                  | Completed second recall: 55 (66%); weight of child: young infants 15lb (SE 1), older infants 20lb (SE 0), toddlers 28lb (SE 1); breastfeeding status: initiated 79 (82%), breastfed to 4 mo: 50 (53%), currently 4-5.9mo: 7 (41%), currently 6-11.9mo: 7 (23%), currently 12-23.9mo: 6 (18%); supplement usage: 4 (5%) |
| Whaley, 2012 <sup>77</sup>   | Arm 1 | Time 1: 12/2007-3/2009 (before new food package) | 5000 per month     | NR                            | NR   | NR   | NR                       | NR                                 | NR                  | NR   |
| Whaley, 2012 <sup>77</sup>   | Arm 2 | Time 2: 4/2009-                                  | 5000 per month     | NR                            | NR   | NR   | NR                       | NR                                 | NR                  | NR   |

| Author, Year               | Arm   | Arm Name   | Number at Baseline | Sex, n(%) | Age of Children | Race/Ethnicity of Children, n (%) | Age at WIC Certification | Mother Participation in WIC, n (%) | Geographic Location | Other baseline characteristics |
|----------------------------|-------|--|--------------------|-----------|-----------------|-----------------------------------|--------------------------|------------------------------------|---------------------|--------------------------------|
|                            |       | 9/2009 (during training but before new food package) |                    |           |                 |                                   |                          |                                    |                     |                                |
| Whaley, 2012 <sup>77</sup> | Arm 3 | Time 3:10/2009-11/2010 (after new food package)      | 5000 per month     | NR        | NR              | NR                                | NR                       | NR                                 | NR                  | NR                             |

CDS-PSID=Child Development Supplement-Panel Study of Income Dynamics; ECLS= Early Childhood Longitudinal Study; FPL=federal poverty level; n=sample size; NR=not reported; PRAMS=Pregnancy Risk Assessment Monitoring System; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-30. Maternal morbidity continuous outcomes (gestational diabetes mellitus) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Subgroup | Arm   | Arm Name                        | Outcome Definition   | Tool | N                            | Followup Outcome                      | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|---------------------------|----------|-------|---------------------------------|----------------------|------|------------------------------|---------------------------------------|-------------------------|---|---|
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 1 | Infant born before WIC revision | Gestational diabetes | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth. |
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 2 | Infant born after WIC revision  | Gestational diabetes | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -1.1 (95% CI: -1.9 to -0.22), p=NR   | Mother's education, age, and parity and infant's sex and year of birth. |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 1 | Infant born before WIC revision | Gestational diabetes | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth. |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 2 | Infant born after WIC revision  | Gestational diabetes | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -1.1 (95% CI: -2.0 to -0.24), p=NR   | Mother's education, age, and parity and infant's sex and year of birth. |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 1 | Infant born before WIC revision | Gestational diabetes | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth. |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 2 | Infant born after WIC revision  | Gestational diabetes | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -0.31 (95% CI: -0.70 to 0.083), p=NR | Mother's education, age, and parity and infant's sex and year of birth. |

|                           |            |       |                                 |                      |    |                              |                                       |    |   |  |
|---------------------------|------------|-------|---------------------------------|----------------------|----|------------------------------|---------------------------------------|----|---|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 1 | Infant born before WIC revision | Gestational diabetes | NR | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Gestational diabetes | NR | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR | Comparator: Arm1<br>Change in percentage points: -0.035 (95% CI: -0.25 to 0.18), p=NR | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Gestational diabetes | NR | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Gestational diabetes | NR | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR | Comparator: Arm1<br>Change in percentage points: -0.43 (95% CI: -1.5 to 0.66), p=NR   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Gestational diabetes | NR | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Gestational diabetes | NR | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR | Comparator: Arm1<br>Change in percentage points: 0.71 (95% CI: 0.27 to 1.1), p=NR     | Mother's education, age, and parity and infant's sex and year of birth.                |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-31. Maternal morbidity continuous outcomes (Pre-eclampsia) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Subgroup | Arm   | Arm Name                        | Outcome Definition | Tool | N                            | Followup Outcome                      | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|---------------------------------|--------------------|------|------------------------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 1 | Infant born before WIC revision | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 2 | Infant born after WIC revision  | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -0.33 (95% CI: -0.74 to 0.081), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 1 | Infant born before WIC revision | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 2 | Infant born after WIC revision  | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 0.16 (95% CI: -0.74 to 1.1), p=NR    | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 1 | Infant born before WIC revision | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 2 | Infant born after WIC revision  | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -0.55 (95% CI: -0.84 to -0.26), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | NR       | Arm 1 | Infant born before WIC revision | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |



| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition | Tool | N                            | Followup Outcome                      | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|--------------------|------|------------------------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -0.6 (95% CI: -0.76 to -0.43), p=NR  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 0.039 (95% CI: -0.78 to 0.86), p=NR  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Preeclampsia       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -0.31 (95% CI: -0.64 to 0.017), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-32. Maternal gestational weight gain categorical outcomes of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Subgroup | Arm   | Arm Name                        | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|-------|---------------------------------|---|------|---------------|---------------------------------------|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 1 | Infant born before WIC revision | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 2 | Infant born after WIC revision  | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 1.3 (95% CI: -0.095 to 2.7), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 1 | Infant born before WIC revision | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 2 | Infant born after WIC revision  | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 1.7 (95% CI: -0.17 to 3.5), p=NR  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 1 | Infant born before WIC revision | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 2 | Infant born after WIC revision  | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 1 (95% CI: 0.35 to 1.7), p=NR     | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | NR       | Arm 1 | Infant born before WIC revision | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|---|------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 0.86 (95% CI: 0.47 to 1.3), p=NR   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 0.16 (95% CI: --1.6 to 1.9), p=NR  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Gestational weight gain, <IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 2 (95% CI: 1.2 to 2.8), p=NR       | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Asian      | Arm 1 | Infant born before WIC revision | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Asian      | Arm 2 | Infant born after WIC revision  | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -2.2 (95% CI: -3.7 to -0.80), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Black      | Arm 1 | Infant born before WIC revision | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|---|------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | Black      | Arm 2 | Infant born after WIC revision  | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -5.5 (95% CI: -7.7 to -3.3), p=NR  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Hispanic   | Arm 1 | Infant born before WIC revision | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Hispanic   | Arm 2 | Infant born after WIC revision  | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -1.8 (95% CI: -2.7 to -1.0), p=NR  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 1 | Infant born before WIC revision | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -3.2 (95% CI: -3.2 to -2.7), p=NR  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -3.2 (95% CI: -5.6 to -0.90), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Gestational weight gain, >IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth.                |

| Author, Year              | Subgroup | Arm   | Arm Name                        | Outcome Definition                              | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|-------|---------------------------------|---|------|---------------|---------------------------------------|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | White    | Arm 2 | Infant born after WIC revision  | Gestational weight gain, >IOM recommended       | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: -4.2 (95% CI: -5.2 to -3.2), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 1 | Infant born before WIC revision | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 2 | Infant born after WIC revision  | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 0.93 (95% CI: -0.86 to 2.7), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 1 | Infant born before WIC revision | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 2 | Infant born after WIC revision  | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 3.8 (95% CI: 1.4 to 6.2), p=NR    | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 1 | Infant born before WIC revision | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 2 | Infant born after WIC revision  | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 0.8 (95% CI: -0.13 to 1.7), p=NR  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | NR       | Arm 1 | Infant born before WIC revision | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition                              | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|---|------|---------------|---------------------------------------|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 2.3 (95% CI: 2.3 to 2.8), p=NR  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 3.1 (95% CI: 0.50 to 5.6), p=NR | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth.                |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Gestational weight gain, within IOM recommended | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm1<br>Change in percentage points: 2.2 (95% CI: 1.2 to 3.3), p=NR  | Mother's education, age, and parity and infant's sex and year of birth.                |

CI=confidence interval; IOM=Institute of Medicine; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-33. Maternal gestational weight gain continuous outcomes of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup   | Arm   | Arm Name      | Outcome Definition                                      | Tool | N   | Followup Outcome   | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-----------------------------|--|-------|---------------|---|------|---|--|-------------------------|--|--|
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity)                     | Arm 3 | Black Non-WIC | Inadequate weight gain                                  | NR   | Baseline: NR<br>Followup: 20793 observations            | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Ref  | Maternal age dummies and year of birth fixed effects       |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity)                     | Arm 4 | Black WIC     | Inadequate weight gain                                  | NR   | Baseline: NR<br>Followup: 109676 observations           | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Arm3<br>Likelihood of gaining too little weight (% points): -0.0349 (SE 0.0065), p=0     | Maternal age dummies and year of birth fixed effects       |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity)                     | Arm 1 | White Non-WIC | Inadequate weight gain                                  | NR   | Baseline: NR<br>Followup: 34560 observations            | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Ref  | Maternal age dummies and year of birth fixed effects       |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity)                     | Arm 2 | White WIC     | Inadequate weight gain                                  | NR   | Baseline: NR<br>Followup: 106067 observations           | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Arm1<br>Likelihood of gaining too little weight (% points): -0.0264 (SE 0.0062), p=0     | Maternal age dummies and year of birth fixed effects       |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity), discordant mothers | Arm 3 | Black Non-WIC | Inadequate weight gain (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: Arm3+Arm4= 20297 observations | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Ref  | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity), discordant mothers | Arm 4 | Black WIC     | Inadequate weight gain (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: Arm3+Arm4= 20297 observations | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Arm3<br>Likelihood of gaining too little weight (% points): -0.0419 (SE 0.0069), p<0.001 | Maternal age dummies, race and year of birth fixed effects |

| Author, Year                | Subgroup   | Arm   | Arm Name      | Outcome Definition                                      | Tool | N  | Followup Outcome   | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-----------------------------|--|-------|---------------|---|------|--|--|-------------------------|--|--|
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity), Medicaid mothers   | Arm 3 | Black Non-WIC | Inadequate weight gain (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: 20793 observations           | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Ref  | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity), Medicaid mothers   | Arm 4 | Black WIC     | Inadequate weight gain (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: 109676 observations          | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Arm3<br>Likelihood of gaining too little weight (% points): -0.0358 (SE 0.0039), p<0.001 | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity), discordant mothers | Arm 1 | White Non-WIC | Inadequate weight gain (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: Arm1+Arm2=18909 observations | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Ref  | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity), discordant mothers | Arm 2 | White WIC     | Inadequate weight gain (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: Arm1+Arm2=18909 observations | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Arm1<br>Likelihood of gaining too little weight (% points): -0.0277 (SE 0.0064), p<0.001 | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity), Medicaid mothers   | Arm 1 | White Non-WIC | Inadequate weight gain (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: 34560 observations           | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Ref  | Maternal age dummies, race and year of birth fixed effects |



| Author, Year                | Subgroup                                       | Arm   | Arm Name  | Outcome Definition                                      | Tool | N   | Followup Outcome   | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-----------------------------|--|-------|-----------|---|------|---|--|-------------------------|--|--|
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity), Medicaid mothers | Arm 2 | White WIC | Inadequate weight gain (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: 106067 observations | Followup timepoint: At hospital discharge<br>Outcome: NR | NR                      | Comparator: Arm1<br>Likelihood of gaining too little weight (% points): -0.0233 (SE 0.0029), p<0.001 | Maternal age dummies, race and year of birth fixed effects |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-34. Maternal health behavior categorical outcomes (alcohol) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|------------------------|------|---------------|------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 74522         | NR                     | average treatment effect (ordinary least squares): -0.014, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 74522         | NR                     | average treatment effect (propensity score matching): -0.017, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 74522         | NR                     | average treatment effect (inverse probability weighted matching): -0.013, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WIC recipient | ≥1 alcoholic beverages | NR   | 74522         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.013, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                 | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Mother had prenatal care | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 67540         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.009, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Less than high-school attainment | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 32562         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.013, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|------------------------------|------|---------------|------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Restricting to years $\geq 2000$ | Overall | WIC recipient vs eligible non-WiC recipient | $\geq 1$ alcoholic beverages | NR   | 63849         | NR                     | average treatment effect (augmented inverse probability weighted matching):<br>-0.011, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup  | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|---|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked more than 100 cigarettes in last 2 years | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 24100         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.012, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup    | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|-------------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | First birth | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 32922         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.019, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                             | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------------------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Prenatal visit during first 3 months | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 52832         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.008, p=0.05 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                  | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|---------------------------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Intention to get pregnant | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 26,396        | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.017, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked 3 months before pregnancy | Overall | WIC recipient vs eligible non-WiC recipient | ≥1 alcoholic beverages | NR   | 34576         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.016, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 74522         | NR                     | average treatment effect (ordinary least squares): 0.001, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 74522         | NR                     | average treatment effect (propensity score matching): -0.006, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 74522         | NR                     | average treatment effect (inverse probability weighted matching): -0.002, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 74522         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.002, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                 | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------|---------|---|------------------------|------|---------------|------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Mother had prenatal care | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 67540         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.003, p=0.1 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Less than high-school attainment | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 32562         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.003, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|------------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Restricting to years $\geq 2000$ | Overall | WIC recipient vs eligible non-WiC recipient | $\geq 7$ alcoholic beverages | NR   | 63849         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.002, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup  | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|---|---------|---|------------------------|------|---------------|------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked more than 100 cigarettes in last 2 years | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 24100         | NR                     | average treatment effect (augmented inverse probability weighted matching): 0.002, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup    | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|-------------|---------|---|------------------------|------|---------------|------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | First birth | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 32922         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.006, p=0.1 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                             | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------------------|---------|---|------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Prenatal visit during first 3 months | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 52832         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.006, p=0.05 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                  | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|---------------------------|---------|---|------------------------|------|---------------|------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Intention to get pregnant | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 26,396        | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.008, p=0.1 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition     | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|------------------------|------|---------------|------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked 3 months before pregnancy | Overall | WIC recipient vs eligible non-WiC recipient | ≥7 alcoholic beverages | NR   | 34576         | NR                     | average treatment effect (augmented inverse probability weighted matching): 0, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 146095        | NR                     | average treatment effect (propensity score matching): -0.012, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 146095        | NR                     | average treatment effect (inverse probability weighted matching): -0.012, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 146095        | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.012, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                 | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Mother had prenatal care | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 130857        | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.007, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Less than high-school attainment | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 62810         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.013, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Restricting to years $\geq 2000$ | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 112772        | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.011, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup  | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|---|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked more than 100 cigarettes in last 2 years | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 31342         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.017, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup    | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|-------------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | First birth | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 62962         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.013, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                             | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------------------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Prenatal visit during first 3 months | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 101068        | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.005, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                  | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|---------------------------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Intention to get pregnant | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 54,348        | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.009, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|-------------------------|------|---------------|------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked 3 months before pregnancy | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption | NR   | 51080         | NR                     | average treatment effect (augmented inverse probability weighted matching): -0.017, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition                         | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--|------|---------------|------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any alcohol consumption - in 3rd trimester | NR   | 146095        | NR                     | average treatment effect (ordinary least squares): -0.010, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

n=sample size; NA=not available; NR=not reported; NS=not significant; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-35. Maternal health behavior categorical outcomes (smoking) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--------------------|------|---------------|--|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 145888        | Followup: 3rd trimester of pregnancy<br>NR | average treatment effect (propensity score matching):<br>-0.000, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--------------------|------|---------------|--|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 145888        | Followup: 3rd trimester of pregnancy<br>NR | average treatment effect (inverse probability weighted matching): 0.001, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--------------------|------|---------------|--|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 145888        | Followup: 3rd trimester of pregnancy<br>NR | average treatment effect (augmented inverse probability weighted matching): 0.001, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup                 | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------|---------|---|--------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Mother had prenatal care | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 130656        | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|--------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Less than high-school attainment | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 62703         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.001, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                   | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------|---------|---|--------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Restricting to years ≥2000 | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 112623        | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.002, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year | Subgroup  | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------|---|---------|---|--------------------|------|---------------|-------------------------------|--|--------------------------|---|
| Kasim, 20219 | Smoked more than 100 cigarettes in last 2 years | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 30703         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): -0.006, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup    | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|-------------|---------|---|--------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | First birth | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 62849         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.017, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                             | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------------------|---------|---|--------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Prenatal visit during first 3 months | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 100952        | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.007, p=0.05 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                  | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|---------------------------|---------|---|--------------------|------|---------------|-------------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Intention to get pregnant | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 54,352        | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.01, p=0.05 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|--------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked 3 months before pregnancy | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking        | NR   | 51017         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.003, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition             | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--------------------------------|------|---------------|--|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking - in 3rd trimester | NR   | 145888        | Followup: 3rd trimester of pregnancy<br>NR | average treatment effect (ordinary least squares): 0.009, p=0.05 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--------------------------|------|---------------|-------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 146967        | Followup: postpartum NR | average treatment effect (ordinary least squares): 0.016, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--------------------------|------|---------------|-------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 146967        | Followup: postpartum NR | average treatment effect (propensity score matching): -0.006, p=0.05 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--------------------------|------|---------------|-------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 146967        | Followup: postpartum NR | average treatment effect (inverse probability weighted matching): 0.005, p=0.1 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|--------------------------|------|---------------|-------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 146967        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.005, p=0.1 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                 | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------|---------|---|--------------------------|------|---------------|-------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Mother had prenatal care | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 131568        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.005, p=0.1 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|--------------------------|------|---------------|-------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Less than high-school attainment | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 63135         | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.006, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                            | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|-------------------------------------|---------|---|--------------------------|------|---------------|-------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Restricting to years $\geq 2$ NRNR5 | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 113521        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.005, p=0.1 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup  | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|---|---------|---|--------------------------|------|---------------|-------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked more than 1NRNR cigarettes in last 2 years | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 31534         | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.003, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup    | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|-------------|---------|---|--------------------------|------|---------------|-------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | First birth | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 63199         | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.016, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                             | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------------------|---------|---|--------------------------|------|---------------|-------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Prenatal visit during first 3 months | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 101796        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.014, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                  | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|---------------------------|---------|---|--------------------------|------|---------------|-------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Intention to get pregnant | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 54,717        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.015, p=0.01 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition       | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|--------------------------|------|---------------|-------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked 3 months before pregnancy | Overall | WIC recipient vs eligible non-WiC recipient | Any smoking (postpartum) | NR   | 51039         | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.013, p=0.05 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|---------------------------|------|---------------|--|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 57053         | Followup: 3rd trimester of pregnancy<br>NR | average treatment effect (ordinary least squares): 0.071, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|---------------------------|------|---------------|--|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 57053         | Followup: 3rd trimester of pregnancy<br>NR | average treatment effect (propensity score matching): 0.001, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|---------------------------|------|---------------|--|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 57053         | Followup: 3rd trimester of pregnancy<br>NR | average treatment effect (inverse probability weighted matching):<br>-0.052, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|---------|---|---------------------------|------|---------------|--|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | NR       | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 57053         | Followup: 3rd trimester of pregnancy<br>NR | average treatment effect (augmented inverse probability weighted matching):<br>-0.052, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                 | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------|---------|---|---------------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Mother had prenatal care | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 51538         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.035, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|---------------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Less than high-school attainment | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 22722         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.013, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                            | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|-------------------------------------|---------|---|---------------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Restricting to years $\geq 2$ NRNR1 | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 43504         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.009, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup  | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|---|---------|---|---------------------------|------|---------------|-------------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked more than 1NRNR cigarettes in last 2 years | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 16557         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): -0.225, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup    | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|-------------|---------|---|---------------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | First birth | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 24257         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.211, p=0.05 | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                             | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|--------------------------------------|---------|---|---------------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Prenatal visit during first 3 months | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 38217         | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.118, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |

| Author, Year             | Subgroup                  | Arm     | Arm Name                                    | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)        | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|--------------------------|---------------------------|---------|---|---------------------------|------|---------------|-------------------------------|---|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Intention to get pregnant | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day | NR   | 20,458        | Followup: during pregnancy NR | average treatment effect (augmented inverse probability weighted matching): 0.013, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |



| Author, Year             | Subgroup                         | Arm     | Arm Name                                    | Outcome Definition                     | Tool | N at Analysis | Followup Outcome, n(%)           | Within-group Difference  | Between-group Difference | Adjusted Factors  |
|--------------------------|----------------------------------|---------|---|--|------|---------------|----------------------------------|--|--------------------------|---|
| Kasim, 2021 <sup>9</sup> | Smoked 3 months before pregnancy | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day              | NR   | 32799         | Followup: during pregnancy<br>NR | average treatment effect (augmented inverse probability weighted matching): -0.022, p=NR | Comparator: NR           | Demographic controls include age, education, gestational weeks, Hispanic status, marital status, race, and indicators for BMI, first birth, prepregnancy height, weight, stress, and infant's sex. State-specific controls include poverty rate, unemployment, cigarette and alcohol taxes and proportion of the population on SNAP. Standard |
| Kasim, 2021 <sup>9</sup> | NR                               | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 144799        | Followup: postpartum<br>NR       | average treatment effect (ordinary least squares): 0.224, p=0.01                         | Comparator: NR           | 0   |
| Kasim, 2021 <sup>9</sup> | NR                               | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 144799        | Followup: postpartum<br>NR       | average treatment effect (propensity score matching): 0.113, p=0.01                      | Comparator: NR           | 0   |
| Kasim, 2021 <sup>9</sup> | NR                               | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 144799        | Followup: postpartum<br>NR       | average treatment effect (inverse probability weighted matching): 0.1, p=0.01            | Comparator: NR           | 0   |

| Author, Year             | Subgroup   | Arm     | Arm Name                                    | Outcome Definition                     | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference   | Between-group Difference | Adjusted Factors |
|--------------------------|--|---------|---|--|------|---------------|-------------------------|---|--------------------------|------------------|
| Kasim, 2021 <sup>9</sup> | NR   | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 144799        | Followup: postpartum NR | : , p=NR  | Comparator: NR           | 0                |
| Kasim, 2021 <sup>9</sup> | Mother had prenatal care                           | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 129600        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.112, p=NR   | Comparator: NR           | 0                |
| Kasim, 2021 <sup>9</sup> | Less than high-school attainment                   | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 62121         | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.096, p=NR   | Comparator: NR           | 0                |
| Kasim, 2021 <sup>9</sup> | Restricting to years $\geq 2$ NRNR6                | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 112480        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.105, p=0.01 | Comparator: NR           | 0                |
| Kasim, 2021 <sup>9</sup> | Smoked more than 1 NRNR cigarettes in last 2 years | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 30668         | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.119, p=NR   | Comparator: NR           | 0                |
| Kasim, 2021 <sup>9</sup> | First birth  | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 62400         | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.228, p=0.01 | Comparator: NR           | 0                |

| Author, Year             | Subgroup                             | Arm     | Arm Name                                    | Outcome Definition                     | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference   | Between-group Difference | Adjusted Factors |
|--------------------------|--------------------------------------|---------|---|--|------|---------------|-------------------------|---|--------------------------|------------------|
| Kasim, 2021 <sup>9</sup> | Prenatal visit during first 3 months | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 100472        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.201, p=0.01 | Comparator: NR           | 0                |
| Kasim, 2021 <sup>9</sup> | Intention to get pregnant            | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 53,962        | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.202, p=0.01 | Comparator: NR           | 0                |
| Kasim, 2021 <sup>9</sup> | Smoked 3 months before pregnancy     | Overall | WIC recipient vs eligible non-WiC recipient | Cigarette consumption/day (postpartum) | NR   | 49340         | Followup: postpartum NR | average treatment effect (augmented inverse probability weighted matching): 0.233, p=0.01 | Comparator: NR           | 0                |

n=sample size; NA=not available; NR=not reported; NS=not significant; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-36. Maternal healthcare utilization categorical outcomes (prenatal care) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Subgroup | Arm     | Arm Name                                      | Outcome Definition                                      | Tool | N at Analysis | Followup Outcome, n(%)                          | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------|----------|---------|---|---|------|---------------|---|-------------------------|--------------------------|------------------|
| Baer, 2019 <sup>2</sup> | Asian    | Arm 1   | Did not receive WIC benefits during pregnancy | Adequate timing of entry into prenatal care (<4 months) | NA   | 19435         | Followup timepoint: NA<br>Outcome: 13719 (70.6) | Not reported            | Comparator: NR           | NR               |
| Baer, 2019 <sup>2</sup> | Asian    | Arm 2   | Received WIC benefits during pregnancy        | Adequate timing of entry into prenatal care (<4 months) | NA   | 60875         | Followup timepoint: NA<br>Outcome: 44650 (73.4) | Not reported            | Comparator: NR           | NR               |
| Baer, 2019 <sup>2</sup> | Asian    | Overall | All publicly insured mothers                  | Adequate timing of entry into prenatal care (<4 months) | NA   | 81390         | Followup timepoint: NA<br>Outcome: 59065 (72.6) | Not reported            | Comparator: NA           | NR               |
| Baer, 2019 <sup>2</sup> | Black    | Arm 1   | Did not receive WIC benefits during pregnancy | Adequate timing of entry into prenatal care (<4 months) | NA   | 14193         | Followup timepoint: NA<br>Outcome: 9187 (64.7)  | Not reported            | Comparator: NR           | NR               |
| Baer, 2019 <sup>2</sup> | Black    | Arm 2   | Received WIC benefits during pregnancy        | Adequate timing of entry into prenatal care (<4 months) | NA   | 73957         | Followup timepoint: NA<br>Outcome: 53338 (72.1) | Not reported            | Comparator: NR           | NR               |
| Baer, 2019 <sup>2</sup> | Black    | Overall | All publicly insured mothers                  | Adequate timing of entry into prenatal care (<4 months) | NA   | 89886         | Followup timepoint: NA<br>Outcome: 63675 (70.8) | Not reported            | Comparator: NA           | NR               |

| Author, Year            | Subgroup           | Arm     | Arm Name                                      | Outcome Definition                                      | Tool | N at Analysis | Followup Outcome, n(%)                           | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------|--------------------|---------|---|---|------|---------------|--|-------------------------|--------------------------|------------------|
| Baer, 2019 <sup>2</sup> | Hispanic           | Arm 1   | Did not receive WIC benefits during pregnancy | Adequate timing of entry into prenatal care (<4 months) | NA   | 83529         | Followup timepoint: NA<br>Outcome: 56812 (68)    | Not reported            | Comparator: NR           | NR               |
| Baer, 2019 <sup>2</sup> | Hispanic           | Arm 2   | Received WIC benefits during pregnancy        | Adequate timing of entry into prenatal care (<4 months) | NA   | 868835        | Followup timepoint: NA<br>Outcome: 674704 (77.7) | Not reported            | Comparator: NR           | NR               |
| Baer, 2019 <sup>2</sup> | Hispanic           | Overall | All publicly insured mothers                  | Adequate timing of entry into prenatal care (<4 months) | NA   | 966351        | Followup timepoint: NA<br>Outcome: 741649 (76.8) | Not reported            | Comparator: NA           | NR               |
| Baer, 2019 <sup>2</sup> | Non-Hispanic white | Arm 1   | Did not receive WIC benefits during pregnancy | Adequate timing of entry into prenatal care (<4 months) | NA   | 51630         | Followup timepoint: NA<br>Outcome: 35761 (69.3)  | Not reported            | Comparator: NR           | NR               |
| Baer, 2019 <sup>2</sup> | Non-Hispanic white | Arm 2   | Received WIC benefits during pregnancy        | Adequate timing of entry into prenatal care (<4 months) | NA   | 129265        | Followup timepoint: NA<br>Outcome: 92710 (71.7)  | Not reported            | Comparator: NR           | NR               |
| Baer, 2019 <sup>2</sup> | Non-Hispanic white | Overall | All publicly insured mothers                  | Adequate timing of entry into prenatal care (<4 months) | NA   | 185271        | Followup timepoint: NA<br>Outcome: 131436 (70.9) | Not reported            | Comparator: NA           | NR               |

| Author, Year            | Subgroup | Arm     | Arm Name                                      | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)                        | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------|----------|---------|---|---|------|---------------|---|-------------------------|---|--|
| Baer, 2019 <sup>2</sup> | Asian    | Arm 1   | Did not receive WIC benefits during pregnancy | Late entry into prenatal care (>6 months) | NA   | 19435         | Followup timepoint: NA<br>Outcome: 946 (4.8)  | Not reported            | Comparator: Ref   | Maternal age at delivery, education, smoking status, drug or alcohol abuse, and mental illness |
| Baer, 2019 <sup>2</sup> | Asian    | Arm 2   | Received WIC benefits during pregnancy        | Late entry into prenatal care (>6 months) | NA   | 60875         | Followup timepoint: NA<br>Outcome: 2154 (3.5) | Not reported            | Comparator: 2 vs. 1<br>RR: 0.7 (95% CI: 0.6, 0.7), p=NR | Maternal age at delivery, education, smoking status, drug or alcohol abuse, and mental illness |
| Baer, 2019 <sup>2</sup> | Asian    | Overall | All publicly insured mothers                  | Late entry into prenatal care (>6 months) | NA   | 81390         | Followup timepoint: NA<br>Outcome: 3148 (3.9) | Not reported            | Comparator: NA  | NR   |
| Baer, 2019 <sup>2</sup> | Black    | Arm 1   | Did not receive WIC benefits during pregnancy | Late entry into prenatal care (>6 months) | NA   | 14193         | Followup timepoint: NA<br>Outcome: 805 (5.7)  | Not reported            | Comparator: Ref   | Maternal age at delivery, education, smoking status, drug or alcohol abuse, and mental illness |
| Baer, 2019 <sup>2</sup> | Black    | Arm 2   | Received WIC benefits during pregnancy        | Late entry into prenatal care (>6 months) | NA   | 73957         | Followup timepoint: NA<br>Outcome: 3171 (4.3) | Not reported            | Comparator: 2 vs. 1<br>RR: 0.7 (95% CI: 0.6, 0.8), p=NR | Maternal age at delivery, education, smoking status, drug or alcohol abuse, and mental illness |
| Baer, 2019 <sup>2</sup> | Black    | Overall | All publicly insured mothers                  | Late entry into prenatal care (>6 months) | NA   | 89886         | Followup timepoint: NA<br>Outcome: 4043 (4.5) | Not reported            | Comparator: NA  | 0  |

| Author, Year            | Subgroup           | Arm     | Arm Name                                      | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)                         | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------|--------------------|---------|---|---|------|---------------|--|-------------------------|---|--|
| Baer, 2019 <sup>2</sup> | Hispanic           | Arm 1   | Did not receive WIC benefits during pregnancy | Late entry into prenatal care (>6 months) | NA   | 83529         | Followup timepoint: NA<br>Outcome: 4911 (5.9)  | Not reported            | Comparator: Ref   | Maternal age at delivery, education, smoking status, drug or alcohol abuse, and mental illness |
| Baer, 2019 <sup>2</sup> | Hispanic           | Arm 2   | Received WIC benefits during pregnancy        | Late entry into prenatal care (>6 months) | NA   | 868835        | Followup timepoint: NA<br>Outcome: 29970 (3.5) | Not reported            | Comparator: 2 vs. 1<br>RR: 0.6 (95% CI: 0.6, 0.6), p=NR | Maternal age at delivery, education, smoking status, drug or alcohol abuse, and mental illness |
| Baer, 2019 <sup>2</sup> | Hispanic           | Overall | All publicly insured mothers                  | Late entry into prenatal care (>6 months) | NA   | 966351        | Followup timepoint: NA<br>Outcome: 35297 (3.7) | Not reported            | Comparator: NA  | 0  |
| Baer, 2019 <sup>2</sup> | Non-Hispanic white | Arm 1   | Did not receive WIC benefits during pregnancy | Late entry into prenatal care (>6 months) | NA   | 51630         | Followup timepoint: NA<br>Outcome: 2838 (5.7)  | Not reported            | Comparator: Ref   | Maternal age at delivery, education, smoking status, drug or alcohol abuse, and mental illness |
| Baer, 2019 <sup>2</sup> | Non-Hispanic white | Arm 2   | Received WIC benefits during pregnancy        | Late entry into prenatal care (>6 months) | NA   | 129265        | Followup timepoint: NA<br>Outcome: 5652 (4.4)  | Not reported            | Comparator: 2 vs. 1<br>RR: 0.7 (95% CI: 0.7, 0.7), p=NR | Maternal age at delivery, education, smoking status, drug or alcohol abuse, and mental illness |
| Baer, 2019 <sup>2</sup> | Non-Hispanic white | Overall | All publicly insured mothers                  | Late entry into prenatal care (>6 months) | NA   | 185271        | Followup timepoint: NA<br>Outcome: 8730 (4.7)  | Not reported            | Comparator: NA  | NR   |

n=sample size; NA=not available; NR=not reported; NS=not significant; p=p-value; Ref=reference; RR=relative risk; WIC= Supplemental Nutrition Program for Women, Infants, and Children





**Evidence Table D-37. Diet quality continuous outcomes (total HEI score) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|----------------------|------|------------------------------|---|--------------|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Total HEI-2010 Score | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Total HEI-2010 Score | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 2.38 (95% CI: 0.09, 4.67), p=0.04   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Total HEI-2010 Score | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Total HEI-2010 Score | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: -0.58 (95% CI: -3.01, 1.83), p=0.63 | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; EFNEP=Expanded Food and Nutrition Education Program; HEI=Healthy Eating Index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-38. Diet quality continuous outcomes (total HEI score) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup | Arm   | Arm Name     | Outcome Definition | Tool | N  | Followup Outcome  | Outcome Unit | Within-group Difference    | Between-group Difference | Adjusted Factors  |
|-----------------------------|----------|-------|--------------|--------------------|------|----|---|--------------|----------------------------|--------------------------|---|
| Perkins, 2020 <sup>42</sup> | NR       | Arm 1 | WIC          | Total HEI score    | NR   | NR | Followup timepoint: NR<br>Outcome: Baseline:<br>Followup: | NR           | coefficient: -.040, p=0.86 | Comparator: NR           | Adjusted for age, sex, race, rural/urban residence, county, highest grade achieved, real monthly household income, number of children, public assistance programs utilized, hours spent in EFNEP, and year of participation |
| Perkins, 2020 <sup>42</sup> | NR       | Arm 2 | WIC and SNAP | Total HEI score    | NR   | NR | Followup timepoint: NR<br>Outcome: Baseline:<br>Followup: | NR           | coefficient -0.40, p=0.88  | Comparator: NR           | Adjusted for age, sex, race, rural/urban residence, county, highest grade achieved, real monthly household income, number of children, public assistance programs utilized, hours spent in EFNEP, and year of participation |

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition   | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference                                      | Adjusted Factors  |
|----------------------------|----------|-------|-------------------------------------|----------------------|----------|--------------------------------|---|--------------|-------------------------|---|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Total HEI-2015 Score | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 54.1 (IQR 44.7 to 63.4) | NR           | NR                      | Comparator: Ref   | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Total HEI-2015 Score | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 51.9 (IQR 43.1 to 62.8) | NR           | NR                      | Comparator: Arm1<br>Beta: -0.28 (95% CI: -2.51 to 1.95), p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition   | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference                                       | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|----------------------|----------|--------------------------------|---|--------------|-------------------------|--|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household | Total HEI-2015 Score | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 50.7 (IQR 40.6 to 59.6) | NR           | NR                      | Comparator: Arm1<br>Beta: -1.9 (95% CI: -3.74 to -0.07), p=NR  | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household     | Total HEI-2015 Score | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 47.2 (IQR 40.3 to 55.4) | NR           | NR                      | Comparator: Arm1<br>Beta: -3.88 (95% CI: -5.22 to -2.54), p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition   | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference                                       | Adjusted Factors  |
|----------------------------|----------|-------|-----------------------------------|----------------------|----------|--------------------------------|---|--------------|-------------------------|--|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Total HEI-2015 Score | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 50.2 (IQR 47.8 to 59.9) | NR           | NR                      | Comparator: Arm1<br>Beta: -2.08 (95% CI: -3.52 to -0.65), p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |

CI=confidence interval; EFNEP=Expanded Food and Nutrition Education Program; HEI=Healthy Eating Index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-39. Diet quality continuous outcomes (total HEI score) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition                              | Tool     | N                             | Followup Outcome   | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|---|----------|-------------------------------|--|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | total HEI score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 46.8 (Not reported 44.0, 49.5)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 46.8 (95% CI: 44, 49.5), p=REF    | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | total HEI score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 49.8 (Not reported 45.8, 53.8)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 49.8 (95% CI: 45.8, 53.8), p=0.15 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence interval; EFNEP=Expanded Food and Nutrition Education Program; HEI=Healthy Eating Index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-40. Diet quality continuous outcomes (total HEI score) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year             | Subgroup | Arm   | Arm Name         | Outcome Definition   | Tool                      | N                              | Followup Outcome  | Outcome Unit     | Within-group Difference               | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|-------|------------------|----------------------|---------------------------|--------------------------------|---|------------------|---------------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 1 | Hispanic         | HEI-2005 total score | 24-hour recall, NDSR, HEI | Baseline: 112<br>Followup: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 57.3 (SE 1.3)<br>Followup: Mean 58.1 (SE 1.5) | score out of 100 | % change from baseline: 0.014, p=0.62 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 2 | African American | HEI-2005 total score | 24-hour recall, NDSR, HEI | Baseline: 97<br>Followup: 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 43.7 (SE 1.3)<br>Followup: Mean 46.2 (SE 1.3) | score out of 100 | % change from baseline: 0.058, p=0.13 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

CI=confidence interval; HEI=Healthy Eating Index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-41. Diet quality continuous outcomes (total Toddler DQI score) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Subgroup | Arm   | Arm Name     | Outcome Definition      | Tool                       | N                             | Followup Outcome                             | Within-group Difference | Between-group Difference                    | Adjusted Factors  |
|-------------------------|----------|-------|--------------|-------------------------|----------------------------|-------------------------------|--|-------------------------|---|---|
| Kay, 2021 <sup>35</sup> | NR       | Arm 1 | WIC          | Total Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 46.6 (SE 0.9)<br>Followup: NR | NR                      | Comparator: Arm 2 & 3                       | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR       | Arm 2 | WIC-Eligible | Total Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR | Baseline: Mean 48.7 (SE 1.1)<br>Followup: NR | NR                      | Comparator: Arm 1 & 3 : (95% CI: ), p=<0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR       | Arm 3 | Non-WIC      | Total Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR | Baseline: Mean 51.2 (SE 1)<br>Followup: NR   | NR                      | Comparator: Arm 1 & 2 : (95% CI: ), p=<0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |

CI=confidence interval; DQI=Diet Quality Index; N=sample size; NR=not reported; p=p-value; SE=standard error; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-42. Diet quality continuous outcomes (calcium) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Calcium            | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline : NR<br>Followup: Mean 939 (SE 30) | mg           | NR                      | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Calcium            | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline : NR<br>Followup: Mean 985 (SE 32) | mg           | NR                      | Comparator: Arm1<br>p=0.192 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Calcium            | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline : NR<br>Followup: Mean 881 (SE 27) | mg           | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Calcium            | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline : NR<br>Followup: Mean 935 (SE 35) | mg           | NR                      | Comparator: Arm1<br>p=0.157 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |

Mg=milligram; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-43. Diet quality continuous outcomes (calories) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition   | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--|------|--------------------------------|---|--------------|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Calories for solid fats, alcoholic beverages and added sugars (SoFAAS) | NR   | Baseline : NR<br>Followup : NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Calories for solid fats, alcoholic beverages and added sugars (SoFAAS) | NR   | Baseline : NR<br>Followup : NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.64 (95% CI: -0.18, 1.47), p=0.13  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Calories for solid fats, alcoholic beverages and added sugars (SoFAAS) | NR   | Baseline : NR<br>Followup : NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Calories for solid fats, alcoholic beverages and added sugars (SoFAAS) | NR   | Baseline : NR<br>Followup : NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: -0.38 (95% CI: -1.35, 0.59), p=0.44 | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; HEI=Healthy Eating Index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; SoFAAS= solid fats, alcoholic beverages and added sugars; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-44. Diet quality continuous outcomes (calories) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition   | Tool     | N                             | Followup Outcome   | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|--|----------|-------------------------------|--|-------------------------|--|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | empty calories HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 10.5 (95% CI 9.1, 11.8)<br>Followup: NA  | Not reported            | Comparator: 1 vs. 2<br>Difference : 10.5 (95% CI: 9.1, 11.8), p=REF    | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | empty calories HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 12.4 (95% CI 10.5, 14.2)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 12.4 (95% CI: 10.5, 14.2), p=0.081 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence interval; HEI=Healthy Eating Index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; SoFAAS= solid fats, alcoholic beverages and added sugars; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-45. Diet quality continuous outcomes (carbohydrate) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|--------------|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Carbohydrates      | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Carbohydrates      | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 2.64 (95% CI: – 1.12, 6.46), p=0.17 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Carbohydrates      | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Carbohydrates      | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 3.2 (95% CI: – 1.53, 7.74), p=0.17  | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-46. Diet quality continuous outcomes (dietary fiber) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                               | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|---------------------------------|---|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Fibre              | NR   | Baseline: 569<br>Followup : 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 10.6 (SE 0.3) | g            | NR                      | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Fibre              | NR   | Baseline: 509<br>Followup : 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 11.6 (SE 0.3) | g            | NR                      | Comparator: Arm1<br>p=0.004 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Fibre              | NR   | Baseline: 569<br>Followup : 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 14.6 (SE 0.6) | g            | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Fibre              | NR   | Baseline: 509<br>Followup : 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 16.4 (SE 0.7) | g            | NR                      | Comparator: Arm1<br>p=0.013 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

| Author, Year                    | Subgroup       | Arm     | Arm Name         | Outcome Definition | Tool                  | N                               | Followup Outcome  | Outcome Unit | Within-group Difference                          | Between-group Difference | Adjusted Factors  |
|---------------------------------|----------------|---------|------------------|--------------------|-----------------------|---------------------------------|---|--------------|--|--------------------------|---|
| Kong, 2014 <sup>19</sup>        | Mothers        | Arm 1   | Hispanic         | fiber              | 24-hour recall, NDS R | Baseline: 112<br>Followup : 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 9.6 (SE 0.5)<br>Followup: Mean 10.2 (SE 0.5)  | g/1000 kcal  | % change from baseline: -0.09, p=0.05            | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup>        | Mothers        | Arm 2   | African American | fiber              | 24-hour recall, NDS R | Baseline: 97<br>Followup : 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 6.9 (SE 0.7)<br>Followup: Mean 12.6 (SE 0.7)  | g/1000 kcal  | % change from baseline: -0.051, p=0.22           | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women | Overall | 0                | Fiber, g/1000 kcal | 24 hour recall (NDS)  | Baseline: 132<br>Followup : 132 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome: Baseline: Mean 10.6 (SD 5.6)<br>Followup: Mean 11.2 (SD 5.4) | g/1000 kcal  | Mean change from baseline: 0.57 (SD 6.25), p=0.3 | Comparator: NR           | NR  |

| Author, Year                    | Subgroup               | Arm     | Arm Name | Outcome Definition | Tool                 | N                              | Followup Outcome   | Outcome Unit | Within-group Difference                           | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------|---------|----------|--------------------|----------------------|--------------------------------|--|--------------|---|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | NR       | Fiber, g/1000 kcal | 24 hour recall (NDS) | Baseline: 121<br>Followup : 90 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome:<br>Baseline: Mean 5.7 (SD 3)<br>Followup: Mean 6 (SD 2.9) | g/1000 kcal  | Mean change from baseline: 0.25 (SD 4.01), p=0.49 | Comparator: NR           | NR               |

g/100kcal: grams per 100 kilocalories; G=grams; n=sample size; NA=not available; NDS=National Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-47. Diet quality continuous outcomes (energy) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup               | Arm     | Outcome Definition | Tool                  | N                              | Followup Outcome   | Outcome Unit | Within-group Difference                          | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------|---------|--------------------|-----------------------|--------------------------------|--|--------------|--|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | Energy             | 24 hour recall (NDSR) | Baseline: 132<br>Followup: 132 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome:<br>Baseline: Mean 6480 (SD 2431)<br>Followup: Mean 6440 (SD 2692) | kJ           | Mean change from baseline: -39 (SD 3113), p=0.88 | Comparator: NR           | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | Energy             | 24 hour recall (NDSR) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome:<br>Baseline: Mean 7848 (SD 3825)<br>Followup: Mean 7752 (SD 3351) | kJ           | Mean change from baseline: -96 (SD 4094), p=0.8  | Comparator: NR           | NR               |

kJ=kiloJoules; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-48. Diet quality continuous outcomes (folate) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Fibre              | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 351 (SE 15) | ug           | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Fibre              | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 380 (SE 13) | ug           | NR                      | Comparator: Arm1<br>p=0.112 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |

n=sample size; NR=not reported; p=p-value; Ref=reference; SE=standard error; ug=microgram; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-49. Diet quality continuous outcomes (food energy) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year             | Subgroup | Arm   | Arm Name         | Outcome Definition | Tool                 | N                              | Followup Outcome  | Outcome Unit | Within-group Difference                | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|-------|------------------|--------------------|----------------------|--------------------------------|---|--------------|--|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 1 | Hispanic         | energy             | 24-hour recall, NDSR | Baseline: 112<br>Followup: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 1562.2 (SE 65.4)<br>Followup: Mean 1543.6 (SD 70.1) | kcal         | % change from baseline: -0.012, p=0.76 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 2 | African American | energy             | 24-hour recall, NDSR | Baseline: 97<br>Followup: 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 1925 (SE 120.4)<br>Followup: Mean 1796.3 (SD 104.3) | kcal         | % change from baseline: -0.067, p=0.21 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |

BMI=body mass index; f/u=followup; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; SE=standard error; SNAP=Supplemental Nutrition Assistance Program

**Evidence Table D-50. Diet quality continuous outcomes (iron) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Iron               | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 11.8 (SE 0.4) | mg           | NR                      | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Iron               | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 11.8 (SE 0.3) | mg           | NR                      | Comparator: Arm1<br>p=0.948 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Iron               | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 14.4 (SE 0.5) | mg           | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Iron               | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 14.1 (SE 0.5) | mg           | NR                      | Comparator: Arm1<br>p=0.642 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

Mg=milligrams; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-51. Diet quality continuous outcomes (protein) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup       | Arm   | Arm Name     | Outcome Definition          | Tool                                     | N                              | Followup Outcome   | Outcome Unit  | Within-group Difference | Between-group Difference | Adjusted Factors   |
|--------------------------|----------------|-------|--------------|-----------------------------|--|--------------------------------|--|---|-------------------------|--------------------------|--|
| Hamad, 2019 <sup>8</sup> | Pregnant Women | Arm 1 | Pre-revision | Nutrient density of Protein | Block 2005 Food Frequency Questionnaire. | Baseline: 548<br>Followup: 548 | Followup timepoint:<br>Outcome: Baseline: NR<br>Followup: NR | calculated as dietary intake in the form of nutrient density, calculated as the proportion of diet from fats, carbohydrates, and proteins. This formula took the form: total dietary intake (e.g., of fat) in grams × 1,000/total kcal of consumption | NR                      | Comparator: NR           | Covariates included mother's age, educational attainment, marital status, race/ethnicity, receipt of Medicaid during pregnancy, sex of the child, household size, and 5 categories of household income. All models also included indicator variables for child's birth year to account for secular trends. |

| Author, Year             | Subgroup       | Arm   | Arm Name      | Outcome Definition          | Tool                                     | N                              | Followup Outcome  | Outcome Unit  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|--------------------------|----------------|-------|---------------|-----------------------------|--|--------------------------------|---|---|-------------------------|--|--|
| Hamad, 2019 <sup>8</sup> | Pregnant Women | Arm 2 | Post-revision | Nutrient density of Protein | Block 2005 Food Frequency Questionnaire. | Baseline: 711<br>Followup: 711 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: NR | calculated as dietary intake in the form of nutrient density, calculated as the proportion of diet from fats, carbohydrates, and proteins. This formula took the form: total dietary intake (e.g., of fat) in grams × 1,000/total kcal of consumption | NR                      | Comparator: NR<br>Risk difference: B=0.2 (95% CI: – 1.18, 1.59 ), p=0.04 | Covariates included mother's age, educational attainment, marital status, race/ethnicity, receipt of Medicaid during pregnancy, sex of the child, household size, and 5 categories of household income. All models also included indicator variables for child's birth year to account for secular trends. |

| Author, Year             | Subgroup               | Arm   | Arm Name     | Outcome Definition          | Tool                                     | N                              | Followup Outcome   | Outcome Unit  | Within-group Difference | Between-group Difference | Adjusted Factors   |
|--------------------------|------------------------|-------|--------------|-----------------------------|--|--------------------------------|--|---|-------------------------|--------------------------|--|
| Hamad, 2019 <sup>8</sup> | Postpartum Women (1mo) | Arm 1 | Pre-revision | Nutrient density of Protein | Block 2005 Food Frequency Questionnaire. | Baseline: 548<br>Followup: 548 | Followup timepoint:<br>Outcome: Baseline: NR<br>Followup: NR | calculated as dietary intake in the form of nutrient density, calculated as the proportion of diet from fats, carbohydrates, and proteins. This formula took the form: total dietary intake (e.g., of fat) in grams × 1,000/total kcal of consumption | NR                      | Comparator: NR           | Covariates included mother's age, educational attainment, marital status, race/ethnicity, receipt of Medicaid during pregnancy, sex of the child, household size, and 5 categories of household income. All models also included indicator variables for child's birth year to account for secular trends. |

| Author, Year             | Subgroup               | Arm   | Arm Name      | Outcome Definition          | Tool                                     | N                              | Followup Outcome  | Outcome Unit  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|--------------------------|------------------------|-------|---------------|-----------------------------|--|--------------------------------|---|---|-------------------------|--|--|
| Hamad, 2019 <sup>8</sup> | Postpartum Women (1mo) | Arm 2 | Post-revision | Nutrient density of Protein | Block 2005 Food Frequency Questionnaire. | Baseline: 711<br>Followup: 711 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: NR | calculated as dietary intake in the form of nutrient density, calculated as the proportion of diet from fats, carbohydrates, and proteins. This formula took the form: total dietary intake (e.g., of fat) in grams × 1,000/total kcal of consumption | NR                      | Comparator: NR<br>Risk difference: B=−0.47 (95% CI: −2.14, 1.22), p=0.59 | Covariates included mother's age, educational attainment, marital status, race/ethnicity, receipt of Medicaid during pregnancy, sex of the child, household size, and 5 categories of household income. All models also included indicator variables for child's birth year to account for secular trends. |

CI=confidence interval; Kcal=kilocalories; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-52. Diet quality continuous outcomes (zinc) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                  | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|---------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old | Arm 1 | Pre-revision (2005-2008)  | Zinc               | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 8.6 (SE 0.2) | mg           | NR                      | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old | Arm 2 | Post-revision (2011-2014) | Zinc               | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 8.1 (SE 0.2) | mg           | NR                      | Comparator: Arm1<br>p=0.061 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |

Mg=milligrams; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-53. Diet quality continuous outcomes (fat) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Fat                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Fat                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Difference in difference, beta: -1.2 (95% CI: -2.48, 0.07), p=0.06  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Fat                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Fat                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Difference in difference, beta: -1.15 (95% CI: -2.68, 0.38), p=0.14 | Age, marriage status, household income, child gender, race, education, household size |

HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-54. Diet quality continuous outcomes (fat) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|---|--------------|-------------------------|---|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Saturated fat      | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 6.4 (2.7 to 9.4)  | NR           | NR                      | Comparator : Ref  | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Saturated fat      | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 7.1 (2.8 to 10.0) | NR           | NR                      | Comparator : Arm1<br>Beta: 0.17 (95% CI: -0.48 to 0.82), p=NR   | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Saturated fat      | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 5.5 (2.6 to 8.1)  | NR           | NR                      | Comparator : Arm1<br>Beta: -0.67 (95% CI: -1.20 to -0.14), p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference                                       | Adjusted Factors  |
|----------------------------|----------|-------|-----------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|--|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                    | Saturated fat      | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 5.7 (2.7 to 9.0) | NR           | NR                      | Comparator : Arm1<br>Beta: -0.3 (95% CI: -0.69 to 0.09), p=NR  | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Saturated fat      | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 6.1 (2.5 to 9.1) | NR           | NR                      | Comparator : Arm1<br>Beta: -0.28 (95% CI: -0.70 to 0.14), p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |

HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-55. Diet quality continuous outcomes (fat) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|------------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Saturated fat      | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 11.7 (SE 0.3) | % energy     | NR                      | Comparator : Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Saturated fat      | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 11.3 (SE 0.2) | % energy     | NR                      | Comparator : Arm1<br>p=0.288 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Saturated fat      | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 10.9 (SE 0.2) | % energy     | NR                      | Comparator : Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Saturated fat      | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 10.9 (SE 0.2) | % energy     | NR                      | Comparator : Arm1<br>p=0.956 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

| Author, Year                    | Subgroup               | Arm     | Arm Name | Outcome Definition | Tool                  | N                              | Followup Outcome  | Outcome Unit | Within-group Difference                             | Between-group Difference | Adjusted Factors  |
|---------------------------------|------------------------|---------|----------|--------------------|-----------------------|--------------------------------|---|--------------|---|--------------------------|---|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | 0        | Fat, % kcal        | 24 hour recall (NDSR) | Baseline: 132<br>Followup: 132 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome: Baseline: Mean 31.3 (SD 9.1)<br>Followup: Mean 29.4 (SD 9)   | %kcal        | Mean change from baseline: -1.86 (SD 11.43), p=0.06 | Comparator : NR          | NR  |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | 0        | Fat, % kcal        | 24 hour recall (NDSR) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome: Baseline: Mean 37.9 (SD 8.9)<br>Followup: Mean 38.1 (SD 9.3) | %kcal        | Mean change from baseline: 0.24 (SD 12.02), p=0.83  | Comparator : NR          | NR  |
| Kong, 2014 <sup>19</sup>        | Mothers                | Arm 1   | Hispanic | total fat          | 24-hour recall, NDSR  | Baseline: 112<br>Followup: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 32.2 (SE 1)<br>Followup: Mean 30.8 (SD 1.1)   | %kcal        | % change from baseline: -0.043, p=0.24              | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

| Author, Year                    | Subgroup               | Arm     | Arm Name         | Outcome Definition    | Tool                  | N                              | Followup Outcome  | Outcome Unit | Within-group Difference                            | Between-group Difference | Adjusted Factors  |
|---------------------------------|------------------------|---------|------------------|-----------------------|-----------------------|--------------------------------|---|--------------|--|--------------------------|---|
| Kong, 2014 <sup>19</sup>        | Mothers                | Arm 2   | African American | total fat             | 24-hour recall, NDSR  | Baseline: 97<br>Followup: 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 39.2 (SE 1.6)<br>Followup: Mean 38 (SD 1.7)   | %kcal        | % change from baseline: -0.03, p=0.38              | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | NR               | Saturated fat, % kcal | 24 hour recall (NDSR) | Baseline: 132<br>Followup: 132 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome: Baseline: Mean 10.9 (SD 4.1)<br>Followup: Mean 10 (SD 3.6) | %kcal        | Mean change from baseline: -0.95 (SD 5.11), p=0.03 | Comparator : NR          | NR  |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | NR               | Saturated fat, % kcal | 24 hour recall (NDSR) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome: Baseline: Mean 12.7 (SD 4)<br>Followup: Mean 13 (SD 4.6)   | %kcal        | Mean change from baseline: 0.35 (SD 5.77), p=0.51  | Comparator : NR          | NR  |

HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children





**Evidence Table D-56. Diet quality continuous outcomes (fatty acids) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|--------------|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Fatty acids        | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Fatty acids        | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Arm1<br>Difference in difference, beta: 0.5 (95% CI: – 0.48, 0.58), p=0.86   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Fatty acids        | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Fatty acids        | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Arm1<br>Difference in difference, beta: -0.21 (95% CI: – 0.79, 0.37), p=0.48 | Age, marriage status, household income, child gender, race, education, household size |

BMI=body mass index; CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-57. Diet quality continuous outcomes (fatty acids) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference      | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|---|--------------|-------------------------|-------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Fatty acids        | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 4 (0.7 to 7.3)    | NR           | NR                      | Comparator : All groups p=0.1 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Fatty acids        | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 4.2 (0.74 to 8.5) | NR           | NR                      | Comparator : All groups p=0.1 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Fatty acids        | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 3.8 (0.7 to 7.0)  | NR           | NR                      | Comparator : All groups p=0.1 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Fatty acids        | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 4.6 (1.3 to 8.8)  | NR           | NR                      | Comparator : All groups p=0.1 | NR               |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-----------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Fatty acids        | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 4.7 (0.8 to 9.0) | NR           | NR                      | Comparator : All groups<br>p=0.1 | NR               |

BMI=body mass index; CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-58. Diet quality continuous outcomes (fatty acids) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition  | Tool     | N                             | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|---|----------|-------------------------------|---|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | fatty acids ratio HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 4.5 (Not reported 3.8, 5.3)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 4.5 (95% CI: 3.8, 5.3), p=REF   | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | fatty acids ratio HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 4.2 (Not reported 3.2, 5.1)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 4.2 (95% CI: 3.2, 5.1), p=0.493 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

BMI=body mass index; CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-59. Diet quality continuous outcomes (fatty acids) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year             | Subgroup | Arm   | Arm Name         | Outcome Definition | Tool                 | N                              | Followup Outcome  | Outcome Unit | Within-group Difference                | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|-------|------------------|--------------------|----------------------|--------------------------------|---|--------------|--|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 1 | Hispanic         | saturated fat      | 24-hour recall, NDSR | Baseline: 112<br>Followup: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 11.2 (SE 0.5)<br>Followup: Mean 10.2 (SD 0.5) | %kcal        | % change from baseline: -0.09, p=0.05  | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 2 | African American | saturated fat      | 24-hour recall, NDSR | Baseline: 97<br>Followup: 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 13.3 (SE 0.7)<br>Followup: Mean 12.6 (SD 0.7) | %kcal        | % change from baseline: -0.051, p=0.22 | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

BMI=body mass index; CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-60. Diet quality continuous outcomes (nuts and seeds) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|--------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Other Vegetables   | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.25 (SE 0.05) | oz-equiv     | NR                      | Comparator: Ref          | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Other Vegetables   | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.23 (SE 0.06) | oz-equiv     | NR                      | Comparator: Arm1 p=0.738 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Nuts and seeds     | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SE 0.06)  | oz-equiv     | NR                      | Comparator: Ref          | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Nuts and seeds     | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.44 (SE 0.16) | oz-equiv     | NR                      | Comparator: Arm1 p=0.329 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

CI=confidence intervals; n=sample size; NA=not available; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-61. Diet quality continuous outcomes (seafood) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition         | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|----------------------------|------|------------------------------|---|--------------|-------------------------|--|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Seafood and plant proteins | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Seafood and plant proteins | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Arm1<br>Difference in difference, beta: -0.19 (95% CI: -0.51, 0.12), p=0.22 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Seafood and plant proteins | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Seafood and plant proteins | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Arm1<br>Difference in difference, beta: -0.2 (95% CI: -0.55, 0.15), p=0.26  | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-62. Diet quality continuous outcomes (seafood) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition         | Tool     | N                              | Followup Outcome   | Within-group Difference | Between-group Difference          | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|----------------------------|----------|--------------------------------|--|-------------------------|-----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Seafood and plant proteins | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 2.2 (0.0 to 5)   | NR                      | Comparator : All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Seafood and plant proteins | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 1.4 (0.0 to 4.1) | NR                      | Comparator : All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Seafood and plant proteins | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 1.2 (0.0 to 4.3) | NR                      | Comparator : All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Seafood and plant proteins | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 1 (0.0 to 4.1)   | NR                      | Comparator : All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household   | Seafood and plant proteins | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 1 (4 to 4.6)     | NR                      | Comparator : All groups<br>p<0.05 | NR               |

CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-63. Diet quality continuous outcomes (seafood) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition  | Tool     | N                             | Followup Outcome  | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|---|----------|-------------------------------|---|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | seafood and plant protein HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 1.4 (95% CI 0.9, 1.8)<br>Followup: NA | Comparator: 1 vs. 2<br>Difference : 1.4 (95% CI: 0.9, 1.8), p=REF   | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | seafood and plant protein HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 2.1 (95% CI 1.4, 2.7)<br>Followup: NA | Comparator: 1 vs. 2<br>Difference : 2.1 (95% CI: 1.4, 2.7), p=0.087 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-64. Diet quality continuous outcomes (seafood) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|--------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Seafood            | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.08 (SE 0.04) | oz-equiv     | NR                      | Comparator: Ref          | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Seafood            | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.12 (SE 0.05) | oz-equiv     | NR                      | Comparator: Arm1 p=0.439 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Seafood            | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.06 (SE 0.05) | oz-equiv     | NR                      | Comparator: Ref          | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |

| Author, Year               | Subgroup                  | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|---------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old | Arm 2 | Post-revision (2011-2014) | Seafood            | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.02 (SE 0.02) | oz-equiv     | NR                      | Comparator: Arm1<br>p=0.209 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |

CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-65. Diet quality continuous outcomes (total protein) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup         | Arm   | Arm Name      | Outcome Definition  | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------|------------------|-------|---------------|---------------------|------|------------------------------|---|--------------|-------------------------|--|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy | Arm 1 | Pre-revision  | Total protein foods | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy | Arm 2 | Post-revision | Total protein foods | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.01 (95% CI: -0.17, 0.18), p=0.95 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy | Arm 1 | Pre-revision  | Protein             | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy | Arm 2 | Post-revision | Protein             | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.2 (95% CI: -1.18, 1.59), p=0.77  | Age, marriage status, household income, child gender, race, education, household size |

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition  | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|---------------------|------|------------------------------|---|--------------|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Total protein foods | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Total protein foods | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: -0.05 (95% CI: -0.26, 0.16), p=0.63 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Protein             | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Protein             | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: -0.47 (95% CI: -2.14, 1.22), p=0.59 | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-66. Diet quality continuous outcomes (total protein) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition  | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference       | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|---------------------|----------|--------------------------------|--|--------------|-------------------------|--------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Total protein foods | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 4.4 (2.5 to 5) | NR           | NR                      | Comparator : All groups p=0.16 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Total protein foods | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 3.6 (2.2 to 5) | NR           | NR                      | Comparator : All groups p=0.16 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Total protein foods | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 4.4 (2.4 to 5) | NR           | NR                      | Comparator : All groups p=0.16 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Total protein foods | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 4.4 (2.3 to 5) | NR           | NR                      | Comparator : All groups p=0.16 | NR               |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition  | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference          | Adjusted Factors |
|----------------------------|----------|-------|-----------------------------------|---------------------|----------|--------------------------------|--|--------------|-------------------------|-----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Total protein foods | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint:<br>Outcome:<br>Baseline: NR<br>Followup: Median 4.4 (2.4 to 5) | NR           | NR                      | Comparator : All groups<br>p=0.16 | NR               |

CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-67. Diet quality continuous outcomes (total protein) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition  | Tool     | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|---|----------|-------------------------------|---|--------------|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | total protein HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 4.2 (95% CI 3.9, 4.5)<br>Followup: NA | NA           | Not reported            | Comparator: 1 vs. 2<br>Difference: 4.2 (95% CI: 3.9, 4.5),<br>p=REF   | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | total protein HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 4.3 (95% CI 3.9, 4.7)<br>Followup: NA | NA           | Not reported            | Comparator: 1 vs. 2<br>Difference: 4.3 (95% CI: 3.9, 4.7),<br>p=0.596 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-68. Diet quality continuous outcomes (total protein) of studies investigating the Key Question 2 association of the 2009 food package change with between infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|------------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Other Vegetables   | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint : NR<br>Outcome :<br>Baseline: NR<br>Followup : Mean 3.03 (SE 0.15) | oz-equiv     | NR                      | Comparator : Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Other Vegetables   | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint : NR<br>Outcome :<br>Baseline: NR<br>Followup : Mean 2.92 (SE 0.13) | oz-equiv     | NR                      | Comparator : Arm1<br>p=0.511 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Total Protein      | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint : NR<br>Outcome :<br>Baseline: NR<br>Followup : Mean 5.17 (SE 0.21) | oz-equiv     | NR                      | Comparator : Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followu p Outcom e   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Total Protein      | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint : NR<br>Outcome :<br>Baseline: NR<br>Followup : Mean 4.83 (SE 0.28) | oz-equiv     | NR                      | Comparator : Arm1<br>p=0.29 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |

CI=confidence intervals; HEI=healthy eating index; n=sample size; NA=not available; NR=not reported; oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-69. Diet quality continuous outcomes (sodium) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|--------------|-------------------------|--|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Sodium             | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Sodium             | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.41 (95% CI: -0.13, 0.95), p=0.13 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Sodium             | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Sodium             | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.08 (95% CI: -0.54, 0.69), p=0.8  | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; HEI=healthy eating index; Mg=milligrams; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-70. Diet quality continuous outcomes (sodium) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference      | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|---|--------------|-------------------------|-------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Sodium             | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 7.9 (IQR 4.2 to 10.0) | NR           | NR                      | Comparator: All groups p=0.06 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Sodium             | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 9.5 (IQR 5.5 to 10.0) | NR           | NR                      | Comparator: All groups p=0.06 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Sodium             | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 8.2 (IQR 4.3 to 10.0) | NR           | NR                      | Comparator: All groups p=0.06 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Sodium             | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 7.7 (IQR 3.7 to 10.0) | NR           | NR                      | Comparator: All groups p=0.06 | NR               |

| Author,<br>Year               | Subgroup | Arm   | Arm Name                                   | Outcome<br>Definition | Tool     | N                                    | Followup<br>Outcome  | Outcome<br>Unit | Within-<br>group<br>Difference | Between-<br>group<br>Difference     | Adjusted<br>Factors |
|-------------------------------|----------|-------|--|-----------------------|----------|--------------------------------------|--|-----------------|--------------------------------|-------------------------------------|---------------------|
| Litvak,<br>2020 <sup>38</sup> | NR       | Arm 5 | Income<br>eligible for<br>WIC<br>household | Sodium                | HEI-2015 | Baseline:<br>432<br>Followup:<br>432 | Followup<br>timepoint: NR<br>Outcome:<br>Baseline: NR<br>Followup:<br>Median 8.2<br>(IQR 3.8 to<br>10.0) | NR              | NR                             | Comparator:<br>All groups<br>p=0.06 | NR                  |

CI=confidence interval; HEI=healthy eating index; Mg=milligrams; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-71. Diet quality continuous outcomes (sodium) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition   | Tool     | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|--|----------|-------------------------------|---|--------------|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | sodium HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 5.4 (95% CI 4.8, 6.1)<br>Followup: NA | NA           | Not reported            | Comparator : 1 vs. 2<br>Difference : 5.4 (95% CI: 4.8, 6.1),<br>p=REF | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | sodium HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 5.1 (95% CI 4, 6.2)<br>Followup: NA   | NA           | Not reported            | Comparator : 1 vs. 2<br>Difference : 5.1 (95% CI: 4, 6.2),<br>p=0.547 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence interval; HEI=healthy eating index; Mg=milligrams; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-72. Diet quality continuous outcomes (sodium) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Saturated fat      | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 2178 (NR 50) | mg           | NR                      | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Saturated fat      | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 2245 (NR 38) | mg           | NR                      | Comparator: Arm1<br>p=0.172 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Sodium             | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 3096 (NR 58) | mg           | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Sodium             | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 3342 (NR 63) | mg           | NR                      | Comparator: Arm1<br>p=0.002 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

CI=confidence interval; HEI=healthy eating index; Mg=milligrams; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children





**Evidence Table D-73. Diet quality continuous outcomes (added sugars) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Add sugars         | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 6.8 (3.1 to 8.7) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Add sugars         | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 6.8 (2.4 to 9.7) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Add sugars         | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 6.6 (2.1 to 9.5) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Add sugars         | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 5.3 (1.5 to 8.5) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household   | Add sugars         | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 6.6 (1.9 to 9.4) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |

HEI=healthy eating index; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; tsp-equiv=teaspoon equivalent; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-74. Diet quality continuous outcomes (added sugars) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|------------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Added sugars       | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 12.1 (SE 0.6) | tsp-equiv    | NR                      | Comparator : Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Added sugars       | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 11.1 (SE 1)   | tsp-equiv    | NR                      | Comparator : Arm1<br>p=0.242 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Added sugars       | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 21.1 (SE 0.8) | tsp-equiv    | NR                      | Comparator : Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Added sugars       | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 17.8 (SE 1.6) | tsp-equiv    | NR                      | Comparator : Arm1<br>p=0.068 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

HEI=healthy eating index; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; tsp-equiv=teaspoon equivalent; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-75. Diet quality continuous outcomes (sugar sweetened beverages) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup               | Arm     | Arm Name | Outcome Definition  | Tool                 | Follow up                             | N                               | Followup Outcome   | Outcome Unit                       | Within-group Difference                           | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------|---------|----------|---|----------------------|---------------------------------------|---------------------------------|--|------------------------------------|---|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | Overall  | includes sweetened soft drinks, fruit drinks, tea, coffee, coffee substitutes, water, and nondairy supplements, including sports drinks. One serving is 8 fluid ounces. | 24 hour recall (NDS) | 6 months post WIC food package change | Baseline: 132<br>Followup : 121 | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 0.9 (SD 1.2)<br>Followup: Mean 1 (SD 1.4)   | serving/day (one serving is 1 cup) | Mean change from baseline: 0.03 (SD 1.52), p=0.83 | Comparator : NR          | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | Overall  | includes sweetened soft drinks, fruit drinks, tea, coffee, coffee substitutes, water, and nondairy supplements, including sports drinks. One serving is 8 fluid ounces. | 24 hour recall (NDS) | 6 months post WIC food package change | Baseline: 121<br>Followup : 90  | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 1.8 (SD 1.8)<br>Followup: Mean 2.1 (SD 1.7) | serving/day (one serving is 1 cup) | Mean change from baseline: 0.28 (SD 1.9), p=0.11  | Comparator : NR          | NR               |

| Author, Year             | Subgroup | Arm   | Arm Name         | Outcome Definition                | Tool                 | Follow up                | N                               | Followup Outcome   | Outcome Unit         | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|-------|------------------|-----------------------------------|----------------------|--------------------------|---------------------------------|--|----------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 1 | Hispanic         | SSB intake (one serving = 8fl oz) | 24-hour recall, NDSR | 18 months after baseline | Baseline: 112<br>Followup : 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.56 (NR)<br>Followup: Mean 0.55 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 2 | African American | SSB intake (one serving = 8fl oz) | 24-hour recall, NDSR | 18 months after baseline | Baseline: 97<br>Followup : 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.78 (NR)<br>Followup: Mean 0.77 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

n=sample size; NA=not available; NDS=National Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviations; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-76. Diet quality categorical outcomes (vegetable) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name         | Outcome Definition                | To ol | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|----------|-------|------------------|-----------------------------------|-------|---------------|---|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR       | Arm 1 | Pre-revision WIC | Respondent eating more vegetables | NR    | 3004          | Followup timepoint: July 2009 before WIC revision<br>Outcome: NR (39) | NR           | NR                      | Comparator : Ref         | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |



| Author, Year               | Subgroup | Arm   | Arm Name          | Outcome Definition                | Tool | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors  |
|----------------------------|----------|-------|-------------------|-----------------------------------|------|---------------|---|--------------|-------------------------|------------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR       | Arm 2 | Post-revision WIC | Respondent eating more vegetables | NR   | 2996          | Followup timepoint: January 2010 after WIC revision<br>Outcome: NR (46.2) | NR           | NR                      | Comparator : Arm1<br>p<0.001 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-77. Diet quality continuous outcomes (vegetable: beans) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | To ol | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|-------|------------------------------|---|--------------|-------------------------|--|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Greens and beans   | NR    | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Greens and beans   | NR    | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.02 (95% CI: – 0.34, 0.37), p=0.93  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Greens and beans   | NR    | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Greens and beans   | NR    | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: -0.12 (95% CI: – 0.51, 0.28), p=0.55 | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; HEI=healthy eating index; Mg=milligrams; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-78. Diet quality continuous outcomes (vegetable: beans) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference      | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|-------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Greens and beans   | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 1.2 (0.0 to 4.7) | NR           | NR                      | Comparator: All groups p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Greens and beans   | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 0.5 (0.0 to 4.4) | NR           | NR                      | Comparator: All groups p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Greens and beans   | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 0 (0.0 to 3.2)   | NR           | NR                      | Comparator: All groups p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Greens and beans   | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 0                | NR           | NR                      | Comparator: All groups p<0.05 | NR               |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-----------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|----------------------------------|------------------|
|                            |          |       |                                   |                    |          |                                | (0.0 to 2.2)   |              |                         |                                  |                  |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Greens and beans   | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 0.1 (0.0 to 3.6) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |

CI=confidence interval; HEI=healthy eating index; Mg=milligrams; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-79. Diet quality continuous outcomes (vegetable: beans) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Arm   | Arm Name           | Outcome Definition   | Tool     | N                             | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|-------|--------------------|--|----------|-------------------------------|---|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | Arm 1 | Before WIC changes | total greens and beans HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 1.1 (95% CI 0.7, 1.4)<br>Followup: NA | Not reported            | Comparator : 1 vs. 2<br>Difference : 1.1 (95% CI: 0.7, 1.4),<br>p=REF   | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | Arm 2 | After WIC changes  | total greens and beans HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 1.3 (95% CI 0.7, 1.8)<br>Followup: NA | Not reported            | Comparator : 1 vs. 2<br>Difference : 1.3 (95% CI: 0.7, 1.8),<br>p=0.492 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence interval; HEI=healthy eating index; Mg=milligrams; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-80. Diet quality continuous outcomes (vegetable: beans) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition                   | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Bean and Peas computed as vegetables | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.05 (SE 0.01) | cup-equiv    | NR                      | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Bean and Peas computed as vegetables | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.08 (SE 0.01) | cup-equiv    | NR                      | Comparator: Arm1<br>p=0.013 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Bean and Peas computed as vegetables | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.14 (SE 0.03) | cup-equiv    | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Bean and Peas computed as vegetables | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.18 (SE 0.06) | cup-equiv    | NR                      | Comparator: Arm1<br>p=0.438 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

CI=confidence interval; HEI=healthy eating index; Mg=milligrams; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-81. Diet quality continuous outcomes (vegetable: dark green vegetables) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition    | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|-----------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Dark Green Vegetables | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.02 (SE 0.01) | cup-equiv    | NR                      | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Dark Green Vegetables | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.06 (SE 0.03) | cup-equiv    | NR                      | Comparator: Arm1<br>p=0.32  | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Dark Green Vegetables | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.05 (SE 0.01) | cup-equiv    | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Dark Green Vegetables | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.09 (SE 0.03) | cup-equiv    | NR                      | Comparator: Arm1<br>p=0.208 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

Cup-equiv=cup equivalent; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-82. Diet quality continuous outcomes (vegetable: total red and orange vegetables) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition              | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|---------------------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Total Red and Orange Vegetables | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SE 0.02)  | cup-equiv    | NR                      | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Total Red and Orange Vegetables | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SE 0.03)  | cup-equiv    | NR                      | Comparator: Arm1<br>p=0.879 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Total Red and Orange Vegetables | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.44 (SE 0.04) | cup-equiv    | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Total Red and Orange Vegetables | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.48 (SE 0.06) | cup-equiv    | NR                      | Comparator: Arm1<br>p=0.491 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

Cup-equiv=cup equivalent; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-83. Diet quality continuous outcomes (other vegetables) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition                              | N                              | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|---|--------------------------------|--|--------------|--------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Other Starchy Vegetables (exclude white potato) | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.33 (SE 0.04) | cup-equiv    | Comparator: Ref          | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Other Starchy Vegetables (exclude white potato) | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.23 (SE 0.04) | cup-equiv    | Comparator: Arm1 p=0.042 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Other Starchy Vegetables (exclude white potato) | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.37 (SE 0.03) | cup-equiv    | Comparator: Ref          | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Other Starchy Vegetables (exclude white potato) | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.4 (SE 0.04)  | cup-equiv    | Comparator: Arm1 p=0.609 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Other Vegetables                                | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.16 (SE 0.01) | cup-equiv    | Comparator: Ref          | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | N                              | Followup Outcome   | Outcome Unit | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|--------------------------------|--|--------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Other Vegetables   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.16 (SE 0.02) | cup-equiv    | Comparator: Arm1<br>p=0.919 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Other Vegetables   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.5 (SE 0.06)  | cup-equiv    | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Other Vegetables   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.5 (SE 0.04)  | cup-equiv    | Comparator: Arm1<br>p=0.954 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

Cup-equiv=cup equivalent; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-84. Diet quality continuous outcomes (total vegetables) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Total vegetables   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Total vegetables   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm1<br>Difference in difference, beta: -0.08 (95% CI: -0.32, 0.16), p=0.51 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Total vegetables   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Total vegetables   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm1<br>Difference in difference, beta: -0.18 (95% CI: -0.45, 0.09), p=0.19 | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-85. Diet quality continuous outcomes (total vegetables) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome   | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|--|---|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Total vegetables   | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 3 (1.5 to 5)     | Comparator: Ref   | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Total vegetables   | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2.4 (1.4 to 4.0) | Comparator: Arm1<br>Beta: -0.26 (95% CI: -0.578 to 0.05),<br>p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Total vegetables   | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2 (0.8 to 3.6)   | Comparator: Arm1<br>Beta: -0.58 (95% CI: -0.83 to -0.32),<br>p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition | Tool     | N                              | Followup Outcome   | Between-group Difference                                       | Adjusted Factors  |
|----------------------------|----------|-------|-----------------------------------|--------------------|----------|--------------------------------|--|--|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                    | Total vegetables   | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2.3 (1.2 to 4.0) | Comparator: Arm1<br>Beta: -0.27 (95% CI: -0.45 to -0.08), p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Total vegetables   | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2.6 (1.1 to 4.8) | Comparator: Arm1<br>Beta: -0.18 (95% CI: -0.38 to 0.02), p=NR  | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-86. Diet quality continuous outcomes (total vegetables) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Arm   | Arm Name           | Outcome Definition   | Tool     | N                             | Followup Outcome  | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|-------|--------------------|--|----------|-------------------------------|---|-------------------------|--|---|
| Oberle, 2020 <sup>20</sup> | Arm 1 | Before WIC changes | total vegetables HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 2.8 (95% CI 2.4, 3.1)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 2.8 (95% CI: 2.4, 3.1),<br>p=REF   | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | Arm 2 | After WIC changes  | total vegetables HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 2.6 (95% CI 2.1, 3.1)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 2.6 (95% CI: 2.1, 3.1),<br>p=0.603 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-87. Diet quality continuous outcomes (total vegetables) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|------------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Total Vegetables   | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.71 (SE 0.06) | cup-equiv    | NR                      | Comparator : Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Total Vegetables   | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.65 (SE 0.05) | cup-equiv    | NR                      | Comparator : Arm1<br>p=0.307 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Total Vegetables   | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 1.36 (SE 0.1)  | cup-equiv    | NR                      | Comparator : Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition  | Tool                 | N                              | Followup Outcome  | Outcome Unit                       | Within-group Difference        | Between-group Difference     | Adjusted Factors  |
|----------------------------|--------------------------------|-------|---------------------------|---|----------------------|--------------------------------|---|------------------------------------|--------------------------------|------------------------------|---|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011–2014) | Total Vegetables  | NR                   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 1.45 (SE 0.09)                                    | cup-equiv                          | NR                             | Comparator : Arm1<br>p=0.375 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.  |
| Kong, 2014 <sup>19</sup>   | Mothers                        | Arm 1 | Hispanic                  | Vegetable intake (includes 1 cup raw leafy vegetables, 1/2 c other cooked or raw veg, or 1/2 c veg juice, excludes fried potatoes and vegetables) | 24-hour recall, NDSR | Baseline: 112<br>Followup: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.79 (SD NR)<br>Followup: Mean 0.75 (SD NR) | % > 0.5 servings / 1000 kcal / day | % change from baseline: p>0.05 | Comparator : NR              | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup>   | Mothers                        | Arm 2 | African American          | Vegetable intake (includes 1 cup raw leafy vegetables, 1/2 c other cooked or raw veg, or 1/2 c veg juice, excludes fried potatoes and vegetables) | 24-hour recall, NDSR | Baseline: 97<br>Followup: 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.74 (SD NR)<br>Followup: Mean 0.81 (SD NR) | % > 0.5 servings / 1000 kcal / day | % change from baseline: p>0.05 | Comparator : NR              | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |



| Author, Year               | Subgroup | Arm   | Arm Name         | Outcome Definition                   | Tool | N                                | Followup Outcome  | Outcome Unit  | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|----------|-------|------------------|--------------------------------------|------|----------------------------------|---|---------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR       | Arm 1 | Pre-revision WIC | Mean vegetable intake, times per day | NR   | Baseline: 3004<br>Followup: 3004 | Followup timepoint: July 2009 before WIC revision<br>Outcome: Baseline: NR<br>Followup: Mean 1.19 (SD 1.38) | times per day | NR                      | Comparator : Ref         | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Subgroup | Arm   | Arm Name          | Outcome Definition                   | Tool | N                                | Followup Outcome  | Outcome Unit  | Within-group Difference | Between-group Difference    | Adjusted Factors  |
|----------------------------|----------|-------|-------------------|--------------------------------------|------|----------------------------------|---|---------------|-------------------------|-----------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR       | Arm 2 | Post-revision WIC | Mean vegetable intake, times per day | NR   | Baseline: 2996<br>Followup: 2996 | Followup timepoint: January 2010 after WIC revision<br>Outcome: Baseline: NR<br>Followup: Mean 1.25 (SD 1.65) | times per day | NR                      | Comparator : Arm1<br>p=0.12 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year                    | Subgroup               | Arm     | Arm Name | Outcome Definition  | Tool                 | N                              | Followup Outcome   | Outcome Unit | Within-group Difference                           | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------|---------|----------|---|----------------------|--------------------------------|--|--------------|---|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | 0        | Includes all NDS vegetable food groups and avocado. One serving is 1 cup of raw leafy vegetables, 1/2 cup of other cooked or raw vegetables, or 1/2 cup of vegetable juice. | 24 hour recall (NDS) | Baseline: 132<br>Followup: 121 | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 2.3 (SD 1.7)<br>Followup: Mean 2.4 (SD 1.8) | serving/day  | Mean change from baseline: 0.09 (SD 2.4), p=0.66  | Comparator : NR          | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | 0        | Includes all NDS vegetable food groups and avocado. One serving is 1 cup of raw leafy vegetables, 1/2 cup of other cooked or raw vegetables, or 1/2 cup of vegetable juice. | 24 hour recall (NDS) | Baseline: 121<br>Followup: 90  | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 1.7 (SD 1.8)<br>Followup: Mean 1.9 (SD 1.8) | serving/day  | Mean change from baseline: 0.15 (SD 2.55), p=0.53 | Comparator : NR          | NR               |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-88. Diet quality categorical outcomes (fruit) of studies investigating Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name          | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%)  | Between-group Difference   | Adjusted Factors  |
|----------------------------|----------|-------|-------------------|------------------------------|------|---------------|---|----------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR       | Arm 1 | Pre-revision WIC  | Respondent eating more fruit | NR   | 3004          | Followup timepoint: July 2009 before WIC revision<br>Outcome: NR (50.3)   | Comparator: Ref            | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |
| Whaley, 2012 <sup>21</sup> | NR       | Arm 2 | Post-revision WIC | Respondent eating more fruit | NR   | 2996          | Followup timepoint: January 2010 after WIC revision<br>Outcome: NR (46.9) | Comparator: Arm1<br>p=0.11 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-89. Diet quality continuous outcomes (fruit juice) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup               | Arm     | Arm Name | Outcome Definition                       | Tool                 | N                              | Followup Outcome   | Outcome Unit                    | Within-group Difference                            | Adjusted Factors  |
|---------------------------------|------------------------|---------|----------|--|----------------------|--------------------------------|--|---------------------------------|--|---|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | Overall  | 100% fruit juice, servings/day           | 24 hour recall (NDS) | Baseline: 132<br>Followup: 121 | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 1 (SD 1.5)<br>Followup: Mean 0.5 (SD 1.9)   | serving/day (1 serving is 4 oz) | Mean change from baseline: -0.45 (SD 2.16), p=0.02 | NR  |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | Overall  | 100% fruit juice, servings/day           | 24 hour recall (NDS) | Baseline: 121<br>Followup: 90  | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 0.7 (SD 1.3)<br>Followup: Mean 0.7 (SD 1.4) | serving/day (1 serving is 4 oz) | Mean change from baseline: -0.04 (SD 1.42), p=0.77 | NR  |
| Kong, 2014 <sup>19</sup>        | Mothers                | Arm 1   | Hispanic | Fruit juice intake (1 serving = 4 fl oz) | 24-hour recall, NDSR | Baseline: 112<br>Followup: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.55 (NR)<br>Followup: Mean 0.38 (SD NR)                 | % > 0 servings / day            | % change from baseline: p<0.05                     | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

| Author, Year             | Subgroup | Arm   | Arm Name         | Outcome Definition                       | Tool                 | N                            | Followup Outcome  | Outcome Unit         | Within-group Difference        | Adjusted Factors  |
|--------------------------|----------|-------|------------------|--|----------------------|------------------------------|---|----------------------|--------------------------------|---|
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 2 | African American | Fruit juice intake (1 serving = 4 fl oz) | 24-hour recall, NDSR | Baseline: 97<br>Followup: 83 | Followup timepoint: 18 months after baseline<br>Outcome:<br>Baseline: Mean 0.34 (NR)<br>Followup: Mean 0.36 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

BMI=body mass index; f/u=followup; fl oz=fluid ounce; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; Oz=ounce; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-90. Diet quality continuous outcomes (total fruit) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Outcome Unit | Between-group Difference   | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|--------------|--|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Total Fruits       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Total Fruits       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Comparator: Arm1<br>Difference in difference, beta: 0.39 (95% CI: 0.11, 0.67), p=0.01  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Total Fruits       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Total Fruits       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Comparator: Arm1<br>Difference in difference, beta: -0.13 (95% CI: -0.44, 0.17), p=0.4 | Age, marriage status, household income, child gender, race, education, household size |

C=cup; CI=confidence interval; f/u=followup; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-91. Diet quality continuous outcomes (total fruit) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|--|--------------|----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Total Fruits       | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2.2 (IQR 0.7 to 4.6) | NR           | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Total Fruits       | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2.6 (IQR 0.9 to 4.4) | NR           | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Total Fruits       | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2 (IQR 0.6 to 3.8)   | NR           | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Total Fruits       | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 1.1 (IQR 0.2 to 2.9) | NR           | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household   | Total Fruits       | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 1.6 (IQR 0.3 to 3.6) | NR           | Comparator: All groups<br>p<0.05 | NR               |

C=cup; CI=confidence interval; f/u=followup; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC=Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-92. Diet quality continuous outcomes (total fruit) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition   | Tool     | N                             | Followup Outcome  | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|--|----------|-------------------------------|---|-------------------------|--|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | total fruits HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 2.8 (95% CI 2.2, 3.3)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 2.8 (95% CI: 2.2, 3.3),<br>p=REF | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | total fruits HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 2.2 (95% CI 1.4, 3)<br>Followup: NA   | Not reported            | Comparator: 1 vs. 2<br>Difference : 2.2 (95% CI: 1.4, 3),<br>p=0.252 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

C=cup; CI=confidence interval; f/u=followup; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-93. Diet quality continuous outcomes (total fruit) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup               | Arm     | Arm Name | Outcome Definition   | Tool                 | N                              | Followup Outcome  | Outcome Unit | Within-group Difference                           | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------|---------|----------|--|----------------------|--------------------------------|---|--------------|---|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | Overall  | NDS fruit food groups, excluding juices, avocado, fried fruits, and fruit-based savory snacks. One serving is 1 medium piece of fruit, 1/4 cup dried fruit, 1/2 cup fresh, frozen, canned, or cooked fruit (chopped or default form), or 1/2 fresh grapefruit. | 24 hour recall (NDS) | Baseline: 132<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome: Baseline: Mean 0.8 (SD 1.2)<br>Followup: Mean 1.1 (SD 1.5) | servings/day | Mean change from baseline: 0.33 (SD 1.88), p=0.04 | Comparator : NR          | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | Overall  | NDS fruit food groups, excluding juices, avocado, fried fruits, and fruit-based savory snacks. One serving is 1 medium piece of fruit, 1/4 cup dried fruit, 1/2 cup fresh, frozen, canned, or cooked fruit (chopped or default form), or 1/2 fresh grapefruit. | 24 hour recall (NDS) | Baseline: 121<br>Followup: 90  | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Outcome: Baseline: Mean 0.2 (SD 0.8)<br>Followup: Mean 0.4 (SD 1.4) | servings/day | Mean change from baseline: 0.21 (SD 1.61), p=0.15 | Comparator : NR          | NR               |

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition    | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|-----------------------|------|--------------------------------|---|--------------|-------------------------|------------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Dark Green Vegetables | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.91 (SE 0.1) | cup-equiv    | NR                      | Comparator : Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Dark Green Vegetables | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 1 (SE 0.16)   | cup-equiv    | NR                      | Comparator : Arm1<br>p=0.672 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |

| Author, Year               | Subgroup | Arm   | Arm Name         | Outcome Definition               | Tool | N                                | Followup Outcome  | Outcome Unit  | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|----------|-------|------------------|----------------------------------|------|----------------------------------|---|---------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR       | Arm 1 | Pre-revision WIC | Mean fruit intake, times per day | NR   | Baseline: 3004<br>Followup: 3004 | Followup timepoint: July 2009 before WIC revision<br>Outcome: Baseline: NR<br>Followup: Mean 1.26 (SD 1.52) | times per day | NR                      | Comparator : Ref         | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Subgroup | Arm   | Arm Name          | Outcome Definition               | Tool | N                                | Followup Outcome  | Outcome Unit  | Within-group Difference | Between-group Difference     | Adjusted Factors  |
|----------------------------|----------|-------|-------------------|----------------------------------|------|----------------------------------|---|---------------|-------------------------|------------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR       | Arm 2 | Post-revision WIC | Mean fruit intake, times per day | NR   | Baseline: 2996<br>Followup: 2996 | Followup timepoint: January 2010 after WIC revision<br>Outcome: Baseline: NR<br>Followup: Mean 1.38 (SD 1.82) | times per day | NR                      | Comparator : Arm1<br>p=0.006 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year             | Subgroup | Arm   | Arm Name         | Outcome Definition   | Tool                 | N                              | Followup Outcome  | Outcome Unit         | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|-------|------------------|--|----------------------|--------------------------------|---|----------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 1 | Hispanic         | Fruit intake (includes 1 medium piece of fruit, 1/4 c dried fruit, 1/2 c fresh, frozen, canned fruit, or 1/2 fresh grapefruit; excludes juices, avocado, and fried fruits) | 24-hour recall, NDSR | Baseline: 112<br>Followup: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.41 (SD NR)<br>Followup: Mean 0.42 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 2 | African American | Fruit intake (includes 1 medium piece of fruit, 1/4 c dried fruit, 1/2 c fresh, frozen, canned fruit, or 1/2 fresh grapefruit; excludes juices, avocado, and fried fruits) | 24-hour recall, NDSR | Baseline: 97<br>Followup: 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.18 (SD NR)<br>Followup: Mean 0.26 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

C=cup; CI=confidence interval; f/u=followup; HEI=healthy eating index; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-94. Diet quality continuous outcomes (whole fruit) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|--------------|-------------------------|--|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Whole Fruits       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Whole Fruits       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.16 (95% CI: – 0.16, 0.47), p=0.34  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Whole Fruits       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Whole Fruits       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: -0.03 (95% CI: – 0.37, 0.31), p=0.85 | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-95. Diet quality continuous outcomes (whole fruit) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference                                      | Adjusted Factors  |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|---|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Whole Fruits       | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2.9 (IQR 0.5 to 5.0) | NR           | NR                      | Comparator: Ref   | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Whole Fruits       | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2.9 (IQR 0.2 to 5)   | NR           | NR                      | Comparator: Arm1<br>Beta: 0.09 (95% CI: -0.27 to 0.45), p=NR  | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Whole Fruits       | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 1.9 (IQR 0.1 to 4.5) | NR           | NR                      | Comparator: Arm1<br>Beta: -0.3 (95% CI: -0.59 to -0.01), p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |



| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference                                       | Adjusted Factors  |
|----------------------------|----------|-------|-----------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|--|---|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                    | Whole Fruits       | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 1.3 (IQR 0 to 3.8)   | NR           | NR                      | Comparator: Arm1<br>Beta: -0.41 (95% CI: -0.63 to -0.20), p=NR | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Whole Fruits       | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 2.1 (IQR 0.2 to 4.9) | NR           | NR                      | Comparator: Arm1<br>Beta: -0.19 (95% CI: -0.42 to 0.04), p=NR  | Gender of the primary respondent, age of the primary respondent, race of the primary respondent, highest educational level in the household, marital status of the primary respondent, and overweight/obesity of the primary respondent |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-96. Diet quality continuous outcomes (whole fruit) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition   | Tool     | N                             | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|--|----------|-------------------------------|---|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | whole fruits HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 2 (95% CI 1.6, 2.5)<br>Followup: NA   | Not reported            | Comparator: 1 vs. 2<br>Difference : 2 (95% CI: 1.6, 2.5), p=REF     | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | whole fruits HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 2.1 (95% CI 1.5, 2.8)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 2.1 (95% CI: 1.5, 2.8), p=0.734 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-97. Diet quality continuous outcomes (whole fruit) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | N                              | Followup Outcome   | Outcome Unit | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|--------------------------------|--|--------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005–2008)  | Whole Fruit        | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.54 (SE 0.06) | cup-equiv    | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011–2014) | Whole Fruit        | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.49 (SE 0.07) | cup-equiv    | Comparator: Arm1<br>p=0.547 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-98. Diet quality categorical outcomes (dairy) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Arm   | Arm Name         | Outcome Definition                         | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-------|------------------|--|---------------|---|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC | Usually consumed by respondent: whole milk | 3004          | Followup timepoint: July 2009 before WIC revision<br>Outcome: NR (26.3) | NR           | NR                      | Comparator: Ref          | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Arm   | Arm Name          | Outcome Definition                         | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors  |
|----------------------------|-------|-------------------|--|---------------|---|--------------|-------------------------|-----------------------------|---|
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC | Usually consumed by respondent: whole milk | 2996          | Followup timepoint: January 2010 after WIC revision<br>Outcome: NR (10.6) | NR           | NR                      | Comparator: Arm1<br>p<0.001 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Arm   | Arm Name         | Outcome Definition                             | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-------|------------------|--|---------------|---|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC | Usually consumed by respondent: lower fat milk | 3004          | Followup timepoint: July 2009 before WIC revision<br>Outcome: NR (70.9) | NR           | NR                      | Comparator: Ref          | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Arm   | Arm Name          | Outcome Definition                             | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors  |
|----------------------------|-------|-------------------|--|---------------|---|--------------|-------------------------|-----------------------------|---|
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC | Usually consumed by respondent: lower fat milk | 2996          | Followup timepoint: January 2010 after WIC revision<br>Outcome: NR (85.2) | NR           | NR                      | Comparator: Arm1<br>p<0.001 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Arm   | Arm Name         | Outcome Definition                         | N at Analysis | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-------|------------------|--|---------------|--|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC | Usually consumed by respondent: other milk | 3004          | Followup timepoint: July 2009 before WIC revision<br>Outcome: NR (1.7) | NR           | NR                      | Comparator: Ref          | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |



| Author, Year               | Arm   | Arm Name          | Outcome Definition                         | N at Analysis | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|-------|-------------------|--|---------------|--|--------------|-------------------------|----------------------------|---|
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC | Usually consumed by respondent: other milk | 2996          | Followup timepoint: January 2010 after WIC revision<br>Outcome: NR (2) | NR           | NR                      | Comparator: Arm1<br>p=0.61 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Arm   | Arm Name         | Outcome Definition                      | N at Analysis | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-------|------------------|---|---------------|--|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | Arm 1 | Pre-revision WIC | Usually consumed by respondent: no milk | 3004          | Followup timepoint: July 2009 before WIC revision<br>Outcome: NR (0) | NR           | NR                      | Comparator: Ref          | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Arm   | Arm Name          | Outcome Definition                      | N at Analysis | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-------|-------------------|---|---------------|--|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | Arm 2 | Post-revision WIC | Usually consumed by respondent: no milk | 2996          | Followup timepoint: January 2010 after WIC revision<br>Outcome: NR (1.3) | NR           | NR                      | Comparator: Arm1<br>p=1  | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-99. Diet quality continuous outcomes (dairy: reduced fat milk) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup               | Arm     | Arm Name | Outcome Definition   | Tool                 | N                               | Followup Outcome   | Outcome Unit                       | Within-group Difference                           | Between-group Difference | Adjusted Factors  |
|---------------------------------|------------------------|---------|----------|--|----------------------|---------------------------------|--|------------------------------------|---|--------------------------|---|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | Overall  | Milk, 2%, 1%, non-fat  | 24 hour recall (NDS) | Baseline: 132<br>Follow up: 121 | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 0.6 (SD 0.8)<br>Followup: Mean 0.8 (SD 0.9) | serving/day (one serving is 1 cup) | Mean change from baseline: 0.21 (SD 1.03), p=0.02 | Comparator: NR           | NR  |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | Overall  | Milk, 2%, 1%, non-fat  | 24 hour recall (NDS) | Baseline: 121<br>Follow up: 90  | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 0.2 (SD 0.8)<br>Followup: Mean 0.3 (SD 0.5) | serving/day (one serving is 1 cup) | Mean change from baseline: 0.04 (SD 0.92), p=0.66 | Comparator: NR           | NR  |
| Kong, 2014 <sup>19</sup>        | Mothers                | Arm 1   | Hispanic | Reduced-fat milk intake (includes 2%, 1%, and non-fat milk) = 1 serving = 8 fl. Oz | 24-hour recall, NDSR | Baseline: 112<br>Follow up: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.53 (SD NR)<br>Followup: Mean 0.65 (SD NR)              | % > 0 servings / day               | % change from baseline: p>0.05                    | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

| Author, Year             | Subgroup | Arm   | Arm Name         | Outcome Definition   | Tool                 | N                            | Followup Outcome  | Outcome Unit         | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|-------|------------------|--|----------------------|------------------------------|---|----------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Mothers  | Arm 2 | African American | Reduced-fat milk intake (includes 2%, 1%, and non-fat milk) = 1 serving = 8 fl. Oz | 24-hour recall, NDSR | Baseline: 97<br>Followup: 83 | Followup timepoint: 18 months after baseline<br>Outcome:<br>Baseline: Mean 0.35 (SD NR)<br>Followup: Mean 0.5 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

BMI=body mass index; Fl oz=fluid ounce; n=sample size; NA=not available; NDS=Nutrition Data System; NDS=Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-100. Diet quality continuous outcomes (dairy: whole milk) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Sub-group              | Arm     | Arm Name | Outcome Definition                       | Tool                  | N                              | Followup Outcome  | Outcome Unit                       | Within-group Difference                             | Between-group Difference | Adjusted Factors  |
|---------------------------------|------------------------|---------|----------|--|-----------------------|--------------------------------|---|------------------------------------|---|--------------------------|---|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women         | Overall | Overall  | Milk, whole, servings/day                | 24 hour recall (NDS)  | Baseline: 132<br>Followup: 121 | Followup timepoint: 6 months post WIC food package change<br>Outcome:<br>Baseline: Mean 0.3 (SD 0.7)<br>Followup: Mean 0.1 (SD 0.3) | serving/day (one serving is 1 cup) | Mean change from baseline: -0.18 (SD 0.68), p=0.004 | Comparator : NR          | NR  |
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | Overall  | Milk, whole, servings/day                | 24 hour recall (NDS)  | Baseline: 121<br>Followup: 90  | Followup timepoint: 6 months post WIC food package change<br>Outcome:<br>Baseline: Mean 0.2 (SD 0.5)<br>Followup: Mean 0.1 (SD 0.3) | serving/day (one serving is 1 cup) | Mean change from baseline: -0.11 (SD 0.55), p=0.02  | Comparator : NR          | NR  |
| Kong, 2014 <sup>19</sup>        | Mothers                | Arm 1   | Hispanic | Whole milk intake = 1 serving = 8 fl. Oz | 24-hour recall, NDS R | Baseline: 112<br>Followup: 109 | Followup timepoint: 18 months after baseline<br>Outcome:<br>Baseline: Mean 0.32 (SD NR)<br>Followup: Mean 0.05 (SD NR)              | % > 0 servings / day               | % change from baseline: p<0.001                     | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

| Author, Year             | Sub-group | Arm   | Arm Name         | Outcome Definition                       | Tool                  | N                            | Followup Outcome   | Outcome Unit         | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|--------------------------|-----------|-------|------------------|--|-----------------------|------------------------------|--|----------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Mothers   | Arm 2 | African American | Whole milk intake = 1 serving = 8 fl. Oz | 24-hour recall, NDS R | Baseline: 97<br>Followup: 83 | Followup timepoint: 18 months after baseline<br>Outcome:<br>Baseline: Mean 0.18 (SD NR)<br>Followup: Mean 0.09 (SD NR) | % > 0 servings / day | % change from baseline: p<0.05 | Comparator : NR          | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

BMI=body mass index; f/u=followup; fl oz=fluid ounce; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; Oz=ounce; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Childre

**Evidence Table D-101. Diet quality continuous outcomes (total dairy) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|--------------|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Total Dairy        | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Total Dairy        | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.16 (95% CI: – 0.36, 0.68), p=0.54 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Total Dairy        | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Total Dairy        | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.01 (95% CI: – 0.58, 0.60), p=0.97 | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-102. Diet quality continuous outcomes (total dairy) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                               | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|---------------------------------|---|--------------|-------------------------|----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Dairy              | HEI-2015 | Baseline: 926<br>Follow up: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 5.7 (IQR 3.1 to 9.1)  | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Dairy              | HEI-2015 | Baseline: 143<br>Follow up: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 6.1 (IQR 1.9 to 10)   | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Dairy              | HEI-2015 | Baseline: 246<br>Follow up: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 6.3 (IQR 3.0 to 10.0) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-----------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                    | Dairy              | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 4.7 (IQR 2.3 to 8.1) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Dairy              | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 5.3 (IQR 2.9 to 8.6) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-103. Diet quality continuous outcomes (total dairy) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition  | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|---|----------|--------------------------------|---|--------------|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | total dairy HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Follow up: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 5.5 (95% CI 4.8, 6.3)<br>Followup: NA | NA           | Not reported            | Comparator: 1 vs. 2<br>Difference : 5.5 (95% CI: 4.8, 6.3), p=REF   | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | total dairy HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Follow up: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 6.1 (95% CI 5.1, 7.2)<br>Followup: NA | NA           | Not reported            | Comparator: 1 vs. 2<br>Difference : 6.1 (95% CI: 5.1, 7.2), p=0.321 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-104. Diet quality continuous outcomes (total dairy) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition                       | Tool | N                               | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--|------|---------------------------------|--|--------------|-------------------------|------------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 1 | Pre-revision (2005-2008)  | Other Vegetables                         | NR   | Baseline: 569<br>Follow up: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 2.15 (SE 0.09) | cup-equiv    | NR                      | Comparator : Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Children 25-59 months old      | Arm 2 | Post-revision (2011-2014) | Other Vegetables                         | NR   | Baseline: 509<br>Follow up: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 2.12 (SE 0.15) | cup-equiv    | NR                      | Comparator : Arm1<br>p=0.869 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Total dairy (milk, yogurt, cheese, whey) | NR   | Baseline: 569<br>Follow up: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 1.53 (SE 0.08) | cup-equiv    | NR                      | Comparator : Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition                       | Tool | N                               | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--|------|---------------------------------|--|--------------|-------------------------|------------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Total dairy (milk, yogurt, cheese, whey) | NR   | Baseline: 509<br>Follow up: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 1.69 (SE 0.18) | cup-equiv    | NR                      | Comparator : Arm1<br>p=0.334 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-105. Diet quality continuous outcomes (grain: refined grains) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|--------------|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Refined grains     | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Refined grains     | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.32 (95% CI: – 0.16, 0.81), p=0.19 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Refined grains     | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Refined grains     | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.31 (95% CI: – 0.25, 0.87), p=0.27 | Age, marriage status, household income, child gender, race, education, household size |

CI=confidence interval; HEI=healthy eating index; Hr=hour; IQR=interquartile range; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-106. Diet quality continuous outcomes (grain: refined grains) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference      | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|---|--------------|-------------------------|-------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Refined grains     | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 7.5 (IQR 3.3 to 10.0) | NR           | NR                      | Comparator: All groups p=0.65 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Refined grains     | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 7.2 (IQR 0.2 to 10.0) | NR           | NR                      | Comparator: All groups p=0.65 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Refined grains     | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 7.5 (IQR 3.9 to 10.0) | NR           | NR                      | Comparator: All groups p=0.65 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Refined grains     | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 7 (IQR 3.2 to 10.0)   | NR           | NR                      | Comparator: All groups p=0.65 | NR               |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition | Tool     | N                               | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-----------------------------------|--------------------|----------|---------------------------------|---|--------------|-------------------------|----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Refined grains     | HEI-2015 | Baseline: 432<br>Follow up: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 7.3 (IQR 2.6 to 10.0) | NR           | NR                      | Comparator: All groups<br>p=0.65 | NR               |

CI=confidence interval; HEI=healthy eating index; Hr=hour; IQR=interquartile range; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-107. Diet quality continuous outcomes (grain: refined grains) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition   | Tool     | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|--|----------|-------------------------------|---|--------------|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | refined grains HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 5.2 (95% CI 4.4, 6)<br>Followup: NA   | NA           | Not reported            | Comparator: 1 vs. 2<br>Difference : 5.2 (95% CI: 4.4, 6), p=REF     | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | refined grains HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 5.1 (95% CI 3.9, 6.2)<br>Followup: NA | NA           | Not reported            | Comparator: 1 vs. 2<br>Difference : 5.1 (95% CI: 3.9, 6.2), p=0.928 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

CI=confidence interval; HEI=healthy eating index; Hr=hour; IQR=interquartile range; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-108. Diet quality continuous outcomes (total grains) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Subgroup                       | Arm   | Arm Name                  | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|----------------------------|--------------------------------|-------|---------------------------|--------------------|------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 1 | Pre-revision (2005-2008)  | Total Grains       | NR   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 6.28 (SE 0.17) | oz-equiv     | NR                      | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |
| Zimmer, 2019 <sup>79</sup> | Adult females aged 19–50 years | Arm 2 | Post-revision (2011-2014) | Total Grains       | NR   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 6.66 (SE 0.22) | oz-equiv     | NR                      | Comparator: Arm1<br>p=0.133 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size. |

n=sample size; NA=not available; NR=not reported; Oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-109. Diet quality continuous outcomes (grains: whole grains) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup              | Arm   | Arm Name      | Outcome Definition | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------|-----------------------|-------|---------------|--------------------|------|------------------------------|---|--------------|-------------------------|---|---|
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 1 | Pre-revision  | Whole grains       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | During pregnancy      | Arm 2 | Post-revision | Whole grains       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.51 (95% CI: – 0.05, 1.06), p=0.08 | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 1 | Pre-revision  | Whole grains       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Age, marriage status, household income, child gender, race, education, household size |
| Hamad, 2019 <sup>8</sup> | at 1 month postpartum | Arm 2 | Post-revision | Whole grains       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference, beta: 0.31 (95% CI: – 0.27, 0.88), p=0.29 | Age, marriage status, household income, child gender, race, education, household size |

BMI=body mass index; f/u=followup; HEI=healthy eating index; IQR=interquartile range; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; Oz-equiv=ounce equivalent; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-110. Diet quality continuous outcomes (grains: whole grains) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                            | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-------------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 1 | Income ineligible for WIC household | Whole grains       | HEI-2015 | Baseline: 926<br>Followup: 926 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 1.5 (IQR 0.0 to 4.5) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 2 | WIC household                       | Whole grains       | HEI-2015 | Baseline: 143<br>Followup: 143 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 0.7 (IQR 0.0 to 4.0) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 3 | WIC+SNAP household                  | Whole grains       | HEI-2015 | Baseline: 246<br>Followup: 246 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 0.7 (IQR 0.0 to 3.9) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |
| Litvak, 2020 <sup>38</sup> | NR       | Arm 4 | SNAP household                      | Whole grains       | HEI-2015 | Baseline: 689<br>Followup: 689 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 0.8 (IQR 0.0 to 2.8) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |

| Author, Year               | Subgroup | Arm   | Arm Name                          | Outcome Definition | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors |
|----------------------------|----------|-------|-----------------------------------|--------------------|----------|--------------------------------|--|--------------|-------------------------|----------------------------------|------------------|
| Litvak, 2020 <sup>38</sup> | NR       | Arm 5 | Income eligible for WIC household | Whole grains       | HEI-2015 | Baseline: 432<br>Followup: 432 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Median 0.9 (IQR 0.0 to 3.3) | NR           | NR                      | Comparator: All groups<br>p<0.05 | NR               |

BMI=body mass index; f/u=followup; HEI=healthy eating index; IQR=interquartile range; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; Oz-equiv=ounce equivalent; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-111. Diet quality continuous outcomes (grains: whole grains) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year               | Subgroup | Arm   | Arm Name           | Outcome Definition   | Tool     | N                             | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|--------------------|--|----------|-------------------------------|---|-------------------------|---|---|
| Oberle, 2020 <sup>20</sup> | NR       | Arm 1 | Before WIC changes | whole grains HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 231<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 1.5 (95% CI 0.9, 2)<br>Followup: NA   | Not reported            | Comparator: 1 vs. 2<br>Difference : 1.5 (95% CI: 0.9, 2), p=REF     | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |
| Oberle, 2020 <sup>20</sup> | NR       | Arm 2 | After WIC changes  | whole grains HEI component score utilizing 2 days 24HR in NHANES | HEI-2010 | Baseline: 81<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 2.4 (95% CI 1.6, 3.2)<br>Followup: NA | Not reported            | Comparator: 1 vs. 2<br>Difference : 2.4 (95% CI: 1.6, 3.2), p=0.054 | age, race/ethnicity, education, household size, marital status, SNAP receipt, food security |

BMI=body mass index; f/u=followup; HEI=healthy eating index; IQR=interquartile range; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; Oz-equiv=ounce equivalent; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-112. Diet quality continuous outcomes (grains: whole grains) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup                       | Arm     | Arm Name                  | Outcome Definition | Tool                 | N                              | Followup Outcome   | Outcome Unit                       | Within-group Difference                         | Between-group Difference    | Adjusted Factors   |
|---------------------------------|--------------------------------|---------|---------------------------|--------------------|----------------------|--------------------------------|--|------------------------------------|---|-----------------------------|--|
| Zimmer, 2019 <sup>79</sup>      | Children 25-59 months old      | Arm 1   | Pre-revision (2005-2008)  | Whole Grains       | NR                   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.53 (SE 0.06)   | oz-equiv                           | NR  | Comparator: Ref             | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup>      | Children 25-59 months old      | Arm 2   | Post-revision (2011-2014) | Whole Grains       | NR                   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.82 (SE 0.06)   | oz-equiv                           | NR  | Comparator: Arm1<br>p=0.001 | Energy (total kilojoules), sex, age, race/ethnicity, income (income to poverty ratio) and household size |
| Zimmer, 2019 <sup>79</sup>      | Adult females aged 19–50 years | Arm 1   | Pre-revision (2005-2008)  | Whole Grains       | NR                   | Baseline: 569<br>Followup: 569 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.62 (SE 0.08)   | oz-equiv                           | NR  | Comparator: Ref             | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Zimmer, 2019 <sup>79</sup>      | Adult females aged 19–50 years | Arm 2   | Post-revision (2011-2014) | Whole Grains       | NR                   | Baseline: 509<br>Followup: 509 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 0.89 (SE 0.19)   | oz-equiv                           | NR  | Comparator: Arm1<br>p=0.087 | Energy (total kilojoules), age, race/ethnicity, income (income to poverty ratio) and household size.     |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Women                 | Overall | 0                         | Whole Grains       | 24 hour recall (NDS) | Baseline: 132<br>Followup: p:  | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 2.4 (SD 2.3)<br>Followup: Mean 2.8 (SD 2.5) | serving/day (one serving is 1 cup) | Mean change from baseline: 0.35 (SD 2.83), p=16 | Comparator: NR              | NR   |

| Author, Year                    | Subgroup               | Arm     | Arm Name         | Outcome Definition   | Tool                 | N                                 | Followup Outcome   | Outcome Unit                       | Within-group Difference                           | Between-group Difference | Adjusted Factors  |
|---------------------------------|------------------------|---------|------------------|--|----------------------|-----------------------------------|--|------------------------------------|---|--------------------------|---|
| Odoms-Young, 2014 <sup>72</sup> | African American Women | Overall | 0                | Whole Grains   | 24 hour recall (NDS) | Baseline: 121<br>Followup: p:     | Followup timepoint: 6 months post WIC food package change<br>Outcome: Baseline: Mean 1.1 (SD 1.9)<br>Followup: Mean 1.2 (SD 1.8) | serving/day (one serving is 1 cup) | Mean change from baseline: 0.12 (SD 2.54), p=0.61 | Comparator: NR           | NR  |
| Kong, 2014 <sup>19</sup>        | Mothers                | Arm 1   | Hispanic         | Whole grain intake (1 serving is one slice of bread, 1 oz ready-to-eat cereal, 1/2 c cooked cereal, rice or pasta) | 24-hour recall, NDSR | Baseline: 112<br>Followup: p: 109 | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.73 (SD NR)<br>Followup: Mean 0.78 (SD NR)              | % > 0 servings / day               | % change from baseline: p>0.05                    | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup>        | Mothers                | Arm 2   | African American | Whole grain intake (1 serving is one slice of bread, 1 oz ready-to-eat cereal, 1/2 c cooked cereal, rice or pasta) | 24-hour recall, NDSR | Baseline: 97<br>Followup: p: 83   | Followup timepoint: 18 months after baseline<br>Outcome: Baseline: Mean 0.63 (SD NR)<br>Followup: Mean 0.58 (SD NR)              | % > 0 servings / day               | % change from baseline: p>0.05                    | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |

BMI=body mass index; f/u=followup; HEI=healthy eating index; IQR=interquartile range; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; Oz-equiv=ounce equivalent; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-113. Household overall food purchase continuous outcomes of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup  | Arm     | Arm Name           | Outcome Definition                      | Tool                           | N                              | Followup Outcome  | Outcome Unit | Within-group Difference                               | Between-group Difference | Adjusted Factors |
|--------------------------|---|---------|--------------------|---|--------------------------------|--------------------------------|---|--------------|---|--------------------------|------------------|
| Fang, 2019 <sup>28</sup> | No  | Overall | All                | Average Treatment Effect on the Treated | Healthy Purchasing Index Score | Baseline: 423<br>Followup: 534 | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: 2.742 (SE 1.351), p=0.042  | Comparator: NR           | NR               |
| Fang, 2019 <sup>28</sup> | No  | Arm 2   | Did not redeem WIC | Average Treatment Effect on the Treated | Healthy Purchasing Index Score | Baseline: 271<br>Followup: 337 | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: -0.843 (SE 1.421), p<0.001 | Comparator: NR           | NR               |
| Fang, 2019 <sup>28</sup> | No  | Arm 3   | Redeemed WIC       | Average Treatment Effect on the Treated | Healthy Purchasing Index Score | Baseline: 152<br>Followup: 178 | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: 9.443 (SE 1.573), p=0.553  | Comparator: NR           | NR               |
| Fang, 2019 <sup>28</sup> | Excludes household not shopping at WIC approved store | Overall | All                | Average Treatment Effect on the Treated | Healthy Purchasing Index Score | Baseline: NR<br>Followup: 527  | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: 2.671 (SE 1.353), p=0.048  | Comparator: NR           | NR               |

| Author, Year             | Subgroup  | Arm     | Arm Name           | Outcome Definition                      | Tool   | N                             | Followup Outcome  | Outcome Unit | Within-group Difference                               | Between-group Difference | Adjusted Factors |
|--------------------------|---|---------|--------------------|---|--|-------------------------------|---|--------------|---|--------------------------|------------------|
| Fang, 2019 <sup>28</sup> | Excludes household not shopping at WIC approved store | Arm 2   | Did not redeem WIC | Average Treatment Effect on the Treated | Healthy Purchasing Index Score   | Baseline: NR<br>Followup: 178 | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: -0.963 (SE 1.425), p=0.499 | Comparator: NR           | NR               |
| Fang, 2019 <sup>28</sup> | Excludes household not shopping at WIC approved store | Arm 3   | Redeemed WIC       | Average Treatment Effect on the Treated | Healthy Purchasing Index Score   | Baseline: NR<br>Followup: 330 | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: 9.385 (SE 1.579), p<0.001  | Comparator: NR           | NR               |
| Fang, 2019 <sup>28</sup> | No  | Overall | All                | Average Treatment Effect on the Treated | Healthy Purchasing Index Score (Excluding primary WIC purchase events) | Baseline: NR<br>Followup: 534 | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: -0.087 (SE 1.277), p=0.946 | Comparator: NR           | NR               |
| Fang, 2019 <sup>28</sup> | No  | Arm 2   | Did not redeem WIC | Average Treatment Effect on the Treated | Healthy Purchasing Index Score (Excluding primary WIC purchase events) | Baseline: NR<br>Followup: 337 | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: -0.843 (SE 1.421), p=0.553 | Comparator: NR           | NR               |

| Author, Year             | Subgroup | Arm   | Arm Name     | Outcome Definition                      | Tool   | N                             | Followup Outcome  | Outcome Unit | Within-group Difference                            | Between-group Difference | Adjusted Factors |
|--------------------------|----------|-------|--------------|---|--|-------------------------------|---|--------------|--|--------------------------|------------------|
| Fang, 2019 <sup>28</sup> | No       | Arm 3 | Redeemed WIC | Average Treatment Effect on the Treated | Healthy Purchasing Index Score (Excluding primary WIC purchase events) | Baseline: NR<br>Followup: 178 | Followup timepoint: Post-match<br>Outcome: Baseline: NR<br>Followup: NR | NR           | Mean change from baseline: 1.42 (SE 1.52), p=0.351 | Comparator: NR           | NR               |

n=sample size; NA=not available; NR=not reported; Oz-equiv=ounce equivalent; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-114. Household food purchase continuous outcomes (food and beverages) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                       | Tool | N                                 | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|--|------|-----------------------------------|---|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Healthy items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 590 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Healthy items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 577 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Healthy items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 859 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Healthy items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 870 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                       | Tool | N                                 | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|--|------|-----------------------------------|--|---|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Healthy items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 66 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Healthy items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 65 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Healthy items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 83 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Healthy items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 82 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                       | Tool | N                                 | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|--|------|-----------------------------------|---|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Healthy items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 590 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Healthy items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 577 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.973 (95% CI: 0.941, 1.006), p=NS   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Healthy items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 859 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Healthy items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 870 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.019 (95% CI: 1.001, 1.037), p≤0.05 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                       | Tool | N                                 | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|--|------|-----------------------------------|--|---|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Healthy items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 66 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Healthy items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 65 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.966 (95% CI: 0.935, 0.998), p≤0.05 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Healthy items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 83 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Healthy items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 82 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.988 (95% CI: 0.972, 1.005), p=NS   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                          | Tool | N                                 | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|---|------|-----------------------------------|---|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Moderation items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 768 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Moderation items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 737 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Moderation items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 957 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Moderation items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 836 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |



| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                          | Tool | N                                 | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|---|------|-----------------------------------|--|---|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Moderation items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 88 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Moderation items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 82 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Moderation items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 99 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Moderation items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 91 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                          | Tool | N                                 | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|---|------|-----------------------------------|---|--|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Moderation items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 768 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Moderation items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 737 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.952 (95% CI: 0.920, 0.986), p=NS    | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Moderation items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 957 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Moderation items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 836 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.845 (95% CI: 0.829, 0.861), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                          | Tool | N                                 | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|---|------|-----------------------------------|--|---|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Moderation items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 88 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Moderation items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 82 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.924 (95% CI: 0.895, 0.954), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Moderation items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 99 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Moderation items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 91 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.914 (95% CI: 0.899, 0.930), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                       | Tool | N                                 | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|--|------|-----------------------------------|---|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Neutral items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 137 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Neutral items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 134 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Neutral items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 144 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Neutral items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 143 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                       | Tool | N                                 | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|--|------|-----------------------------------|--|---|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Neutral items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 18 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Neutral items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 16 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Neutral items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 32 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Neutral items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 25 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                       | Tool | N                                 | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|--|------|-----------------------------------|---|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Neutral items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 137 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Neutral items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 134 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.975 (95% CI: 0.924, 1.028), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Neutral items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 144 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Neutral items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 143 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.987 (95% CI: 0.956, 1.019), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition                       | Tool | N                                 | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|--|------|-----------------------------------|--|---|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Total food and beverages - Neutral items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 18 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Total food and beverages - Neutral items | NR   | Baseline: 1303<br>Followup : 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 16 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.857 (95% CI: 0.816, 0.901), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Total food and beverages - Neutral items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 32 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Total food and beverages - Neutral items | NR   | Baseline: 2137<br>Followup : 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 25 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.782 (95% CI: 0.742, 0.823), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

CI=confidence interval; EBT= Electronic Benefit Transfer; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-115. Household food purchase continuous outcomes (food) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition   | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|----------------------|------|----------------------------------|---|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 355 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 337 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 466 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 489 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |



| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition   | Tool | N                                | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|----------------------|------|----------------------------------|--|---|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 54 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 51 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 67 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 70 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition   | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|----------------------|------|----------------------------------|---|--|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 355 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 337 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.961 (95% CI: 0.930, 0.992), p=NS    | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 466 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 489 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.039 (95% CI: 1.021, 1.057), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition   | Tool | N                                | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|----------------------|------|----------------------------------|--|---|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 54 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 51 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.965 (95% CI: 0.933, 0.999), p≤0.05 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 67 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 70 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.031 (95% CI: 1.012, 1.049), p≤0.01 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                   | Arm   | Arm Name                | Outcome Definition   | Tool | N                                | Followup Outcome  | Outcome Unit                            | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------------------------|-------|-------------------------|----------------------|------|----------------------------------|---|---|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction  | Arm 3 | Pre-WIC, WIC household  | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction  | Arm 4 | Post-WIC, WIC household | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.021 (95% CI: 0.983, 1.061), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction   | Arm 3 | Pre-WIC, WIC household  | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction   | Arm 4 | Post-WIC, WIC household | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.982 (95% CI: 0.954, 1.011), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 3 | Pre-WIC, WIC household  | Food - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                   | Arm   | Arm Name                       | Outcome Definition      | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------------------------|-------|--------------------------------|-------------------------|------|----------------------------------|---|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 4 | Post-WIC, WIC household        | Food - Healthy items    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR               | Expenditure per household per month, \$  | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.009 (95% CI: 0.979, 1.041), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 1 | Pre-WIC, comparison household  | Food - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 329 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 2 | Post-WIC, comparison household | Food - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 303 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR                               | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 3 | Pre-WIC, WIC household         | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 404 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | NR  |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition      | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|-------------------------|------|----------------------------------|---|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 402 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 67 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 60 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 82 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref                                      | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition      | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|-------------------------|------|----------------------------------|---|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 80 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR                               | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 329 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 303 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.935 (95% CI: 0.906, 0.966), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 404 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition      | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|-------------------------|------|----------------------------------|---|--|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 402 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.982 (95% CI: 0.966, 0.999), p≤0.05  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 67 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 60 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.917 (95% CI: 0.887, 0.947), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 82 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |



| Author, Year                  | Sub-group                  | Arm   | Arm Name                | Outcome Definition      | Tool | N                                | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|----------------------------|-------|-------------------------|-------------------------|------|----------------------------------|--|---|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR                         | Arm 4 | Post-WIC, WIC household | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 80 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.953 (95% CI: 0.937, 0.970), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction | Arm 3 | Pre-WIC, WIC household  | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction | Arm 4 | Post-WIC, WIC household | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.065 (95% CI: 1.026, 1.105), p≤0.01  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction  | Arm 3 | Pre-WIC, WIC household  | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction  | Arm 4 | Post-WIC, WIC household | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.016 (95% CI: 0.987, 1.046), p=NS    | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                   | Arm   | Arm Name                       | Outcome Definition      | Tool | N                                | Followup Outcome   | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------------------------|-------|--------------------------------|-------------------------|------|----------------------------------|--|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 3 | Pre-WIC, WIC household         | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$  | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 4 | Post-WIC, WIC household        | Food - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$  | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.023 (95% CI: 0.992, 1.055), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 1 | Pre-WIC, comparison household  | Food - Neutral items    | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 57 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 2 | Post-WIC, comparison household | Food - Neutral items    | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 52 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR                               | NR  |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition   | Tool | N                                | Followup Outcome   | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|----------------------|------|----------------------------------|--|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 70 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 71 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 11 (SD NR) | Expenditure per household per month, \$  | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 10 (SD NR) | Expenditure per household per month, \$  | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition   | Tool | N                                | Followup Outcome   | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|----------------------|------|----------------------------------|--|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 15 (SD NR) | Expenditure per household per month, \$  | NR                      | Comparator: Ref  | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 14 (SD NR) | Expenditure per household per month, \$  | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR                               | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 57 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 52 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.926 (95% CI: 0.889, 0.966), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition   | Tool | N                                | Followup Outcome   | Outcome Unit                             | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|----------------------|------|----------------------------------|--|--|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 70 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 71 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.988 (95% CI: 0.961, 1.016), p=NS    | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Food - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 11 (SD NR) | Expenditure per household per month, \$  | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Food - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 10 (SD NR) | Expenditure per household per month, \$  | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.862 (95% CI: 0.825, 0.901), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                  | Arm   | Arm Name                | Outcome Definition   | Tool | N                                | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|----------------------------|-------|-------------------------|----------------------|------|----------------------------------|--|---|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR                         | Arm 3 | Pre-WIC, WIC household  | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 15 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR                         | Arm 4 | Post-WIC, WIC household | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 14 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.974 (95% CI: 0.941, 1.007), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction | Arm 3 | Pre-WIC, WIC household  | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction | Arm 4 | Post-WIC, WIC household | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.035 (95% CI: 0.972, 1.101), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                   | Arm   | Arm Name                | Outcome Definition   | Tool | N                                | Followup Outcome  | Outcome Unit                            | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------------------------|-------|-------------------------|----------------------|------|----------------------------------|---|---|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction   | Arm 3 | Pre-WIC, WIC household  | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction   | Arm 4 | Post-WIC, WIC household | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.012 (95% CI: 0.966, 1.060), p=NS   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 3 | Pre-WIC, WIC household  | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 4 | Post-WIC, WIC household | Food - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.063 (95% CI: 1.015, 1.113), p≤0.05 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

CI=confidence interval; EBT= Electronic Benefit Transfer; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-116. Household food purchase continuous outcomes (beverages) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition        | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|---------------------------|------|----------------------------------|---|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 187 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 182 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 416 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 414 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |



| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition        | Tool | N                                | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|---------------------------|------|----------------------------------|--|---|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 6 (SD NR)  | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 6 (SD NR)  | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 18 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 15 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition        | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|---------------------------|------|----------------------------------|---|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 187 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 182 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.99 (95% CI: 0.938, 1.046), p=NS  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 416 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 414 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.997 (95% CI: 0.971, 1.025), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition        | Tool | N                                | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|---------------------------|------|----------------------------------|--|---|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 6 (SD NR)  | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Healthy items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 6 (SD NR)  | Expenditure per household per month, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.973 (95% CI: 0.924, 1.025), p=NS   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 18 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 15 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.83 (95% CI: 0.809, 0.851), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                   | Arm   | Arm Name                | Outcome Definition        | Tool | N                                | Followup Outcome  | Outcome Unit                            | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------------------------|-------|-------------------------|---------------------------|------|----------------------------------|---|---|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction  | Arm 3 | Pre-WIC, WIC household  | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction  | Arm 4 | Post-WIC, WIC household | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.173 (95% CI: 1.106, 1.245), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction   | Arm 3 | Pre-WIC, WIC household  | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction   | Arm 4 | Post-WIC, WIC household | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.071 (95% CI: 1.028, 1.115), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 3 | Pre-WIC, WIC household  | Beverages - Healthy items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                   | Arm   | Arm Name                       | Outcome Definition           | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------------------------|-------|--------------------------------|------------------------------|------|----------------------------------|---|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 4 | Post-WIC, WIC household        | Beverages - Healthy items    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR               | Expenditure per household per month, \$  | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.963 (95% CI: 0.925, 1.002), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 1 | Pre-WIC, comparison household  | Beverages - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 366 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 2 | Post-WIC, comparison household | Beverages - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 349 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR                               | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 3 | Pre-WIC, WIC household         | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 617 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | NR  |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition           | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|------------------------------|------|----------------------------------|---|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 470 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 12 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 12 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 20 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref                                      | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition           | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|------------------------------|------|----------------------------------|---|--|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 16 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR                              | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 366 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 349 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.97 (95% CI: 0.928, 1.015), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 617 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition           | Tool | N                                | Followup Outcome  | Outcome Unit                             | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|------------------------------|------|----------------------------------|---|--|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 470 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.753 (95% CI: 0.733, 0.774), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 12 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Moderation items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 12 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.975 (95% CI: 0.929, 1.022), p=NS    | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 20 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |



| Author, Year                  | Sub-group                  | Arm   | Arm Name                | Outcome Definition           | Tool | N                                | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|----------------------------|-------|-------------------------|------------------------------|------|----------------------------------|--|---|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR                         | Arm 4 | Post-WIC, WIC household | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 16 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.766 (95% CI: 0.745, 0.787), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction | Arm 3 | Pre-WIC, WIC household  | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction | Arm 4 | Post-WIC, WIC household | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.891 (95% CI: 0.844, 0.940), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction  | Arm 3 | Pre-WIC, WIC household  | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction  | Arm 4 | Post-WIC, WIC household | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.103 (95% CI: 1.056, 1.153), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                   | Arm   | Arm Name                       | Outcome Definition           | Tool | N                                | Followup Outcome   | Outcome Unit                             | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------------------------|-------|--------------------------------|------------------------------|------|----------------------------------|--|--|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 3 | Pre-WIC, WIC household         | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$  | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 4 | Post-WIC, WIC household        | Beverages - Moderation items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$  | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.101 (95% CI: 1.053, 1.151), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 1 | Pre-WIC, comparison household  | Beverages - Neutral items    | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 66 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR                          | Arm 2 | Post-WIC, comparison household | Beverages - Neutral items    | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 67 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR                                  | NR  |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition        | Tool | N                                | Followup Outcome   | Outcome Unit                             | Within-group Difference | Between-group Difference                             | Adjusted Factors |
|-------------------------------|-----------|-------|--------------------------------|---------------------------|------|----------------------------------|--|--|-------------------------|--|------------------|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 78 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 78 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 5 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref                                      | NR               |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 4 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Arm1<br>Exponentiated coefficients, p=NR | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition        | Tool | N                                | Followup Outcome   | Outcome Unit                             | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|---------------------------|------|----------------------------------|--|--|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 18 (SD NR) | Expenditure per household per month, \$  | NR                      | Comparator: Ref   | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 12 (SD NR) | Expenditure per household per month, \$  | NR                      | Comparator: Arm3<br>Exponentiated coefficients, p=NR                              | NR  |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 66 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 67 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.02 (95% CI: 0.940, 1.107), p=NS | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group | Arm   | Arm Name                       | Outcome Definition        | Tool | N                                | Followup Outcome   | Outcome Unit                             | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------------------------|---------------------------|------|----------------------------------|--|--|-------------------------|--|---|
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 3 | Pre-WIC, WIC household         | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 78 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 4 | Post-WIC, WIC household        | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 78 (SD NR) | Ounces purchased per household per month | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.993 (95% CI: 0.944, 1.045), p=NS   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 1 | Pre-WIC, comparison household  | Beverages - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 5 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Ref  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR        | Arm 2 | Post-WIC, comparison household | Beverages - Neutral items | NR   | Baseline: 1303<br>Followup: 1303 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 4 (SD NR)  | Expenditure per household per month, \$  | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.854 (95% CI: 0.764, 0.954), p≤0.01 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                  | Arm   | Arm Name                | Outcome Definition        | Tool | N                                | Followup Outcome   | Outcome Unit                            | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|----------------------------|-------|-------------------------|---------------------------|------|----------------------------------|--|---|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | NR                         | Arm 3 | Pre-WIC, WIC household  | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 18 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | NR                         | Arm 4 | Post-WIC, WIC household | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: Mean 12 (SD NR) | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.646 (95% CI: 0.594, 0.704), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction | Arm 3 | Pre-WIC, WIC household  | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | State x Period interaction | Arm 4 | Post-WIC, WIC household | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR              | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.121 (95% CI: 1.010, 1.243), p≤0.05  | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

| Author, Year                  | Sub-group                   | Arm   | Arm Name                | Outcome Definition        | Tool | N                                | Followup Outcome  | Outcome Unit                            | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------------------------|-------|-------------------------|---------------------------|------|----------------------------------|---|---|-------------------------|---|---|
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction   | Arm 3 | Pre-WIC, WIC household  | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | SNAP x Period interaction   | Arm 4 | Post-WIC, WIC household | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 1.161 (95% CI: 1.065, 1.265), p≤0.001 | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 3 | Pre-WIC, WIC household  | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Ref   | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |
| Andreyeva, 2016 <sup>22</sup> | Infant x Period interaction | Arm 4 | Post-WIC, WIC household | Beverages - Neutral items | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Expenditure per household per month, \$ | NR                      | Comparator: Arm3<br>Exponentiated coefficients: 0.926 (95% CI: 0.845, 1.014), p=NS    | SNAP, non-food EBT, number of transactions, socio-demographic store area controls |

CI=confidence interval; EBT= Electronic Benefit Transfer; n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-117. Household nutrients purchased continuous outcomes (fiber) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate                                |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Fiber              | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Fiber              | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.2 (95% CI: -0.1 to 0.5), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Fiber              | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Fiber              | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.2 (95% CI: -0.6 to 0.2), p=NR | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-118. Household nutrients purchased continuous outcomes (calories) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Subgroup           | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate                                |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Calories purchased | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | 0            | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Calories purchased | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | 0            | NR                      | Comparator: Arm1<br>Difference in difference early revision: 9.1 (95% CI: -27.4 to 45.6), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Calories purchased | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | 0            | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Calories purchased | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | 0            | NR                      | Comparator: Arm1<br>Difference in difference late revision: -43.4 (95% CI: -89.7 to 2.9), p=NR | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-119. Household nutrients purchased continuous outcomes (protein) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate                                |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Protein            | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Protein            | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.4 (95% CI: -0.8 to 1.5), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Protein            | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Protein            | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.7 (95% CI: -2.2 to 0.7), p=NR | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-120. Household nutrients purchased continuous outcomes (sodium) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate                                |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Sodium purchased   | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Sodium purchased   | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 36.1 (95% CI: -76.6 to 148.9), p=NR  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Sodium purchased   | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Sodium purchased   | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -10.8 (95% CI: -145.5 to 123.9), p=NR | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-121. Household nutrients purchased continuous outcomes (fat) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Subgroup           | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate                                |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Total fat          | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Total fat          | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.3 (95% CI: -1.3 to 1.8), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Total fat          | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Total fat          | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -1.8 (95% CI: -3.8 to 0.1), p=NR | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Subgroup           | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate                                |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Saturated fat      | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Saturated fat      | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 2.8 (95% CI: 0.4 to 5.2), p=NR  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Saturated fat      | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Saturated fat      | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.9 (95% CI: -3.5 to 1.8), p=NR | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-122. Household nutrients purchased continuous outcomes (sugar) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate                                |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Sugar              | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Sugar              | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 1.4 (95% CI: -1.7 to 4.5), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Sugar              | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Sugar              | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -3.3 (95% CI: -7.3 to 0.6), p=NR | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-123. Household selected food purchases continuous outcomes (milk) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                               | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|--------------------|------|---------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Higher-fat milk    | NR   | Baseline: 824<br>Followup : 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Higher-fat milk    | NR   | Baseline: 716<br>Followup : 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: -11.1 (95% CI: -18.9 to -3.3), p≤0.006 | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Higher-fat milk    | NR   | Baseline: 688<br>Followup : 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Higher-fat milk    | NR   | Baseline: 587<br>Followup : 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -15.9 (95% CI: -25.7 to -6.1), p≤0.006  | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                               | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|--------------------|------|---------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Lower-fat milk     | NR   | Baseline: 824<br>Followup : 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Lower-fat milk     | NR   | Baseline: 716<br>Followup : 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 6.5 (95% CI: -0.8 to 13.8), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Lower-fat milk     | NR   | Baseline: 688<br>Followup : 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Lower-fat milk     | NR   | Baseline: 587<br>Followup : 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.5 (95% CI: -9.8 to 8.9), p=NR  | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-124. Household selected food purchases continuous outcomes (convenience) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Ready-to-eat       | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Ready-to-eat       | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.1 (95% CI: -0.8 to 1.0), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Ready-to-eat       | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Ready-to-eat       | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: 0.4 (95% CI: -0.7 to 1.5), p=NR  | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition   | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|----------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Ready-to-heat        | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Ready-to-heat        | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0 (95% CI: -0.7 to 0.6), p=NR   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Ready-to-heat        | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Ready-to-heat        | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.2 (95% CI: -0.9 to 0.6), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Requires preparation | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition   | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|----------------------|------|--------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Requires preparation | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: -0.2 (95% CI: -1.0 to 0.6), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Requires preparation | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Requires preparation | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.2 (95% CI: -1.2 to 0.7), p=NR  | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-125. Household selected food purchases continuous outcomes (processed foods) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Subgroup           | Arm   | Arm Name              | Outcome Definition          | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|-----------------------------|------|--------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Degree of processing - High | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Degree of processing - High | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: -0.1 (95% CI: -1.0 to 0.9), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Degree of processing - High | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Degree of processing - High | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: 0.5 (95% CI: -0.7 to 1.7), p=NR   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Degree of processing - Less | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Degree of processing - Less | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: -0.4 (95% CI: -1.3 to 0.5), p=NR | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Subgroup           | Arm   | Arm Name              | Outcome Definition              | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|---------------------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Degree of processing - Less     | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Degree of processing - Less     | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.9 (95% CI: -2.1 to 0.2), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Degree of processing - Moderate | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Degree of processing - Moderate | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.5 (95% CI: -0.1 to 1.0), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Degree of processing - Moderate | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Degree of processing - Moderate | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: 0.3 (95% CI: -0.3 to 1.0), p=NR  | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-126. Household selected food purchases continuous outcomes (desserts, snacks, candies) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Candy              | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Candy              | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.1 (95% CI: -0.7 to 0.9), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Candy              | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Candy              | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.6 (95% CI: -1.6 to 0.4), p=NR | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition      | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|-------------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Grain-based desserts    | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Grain-based desserts    | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.1 - (95% CI: -1.1 to 1.3), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Grain-based desserts    | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Grain-based desserts    | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: 0 (95% CI: -1.5 to 1.5), p=NR      | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Savory or sweets snacks | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition      | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|-------------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Savory or sweets snacks | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.6 (95% CI: -0.4 to 1.7), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Savory or sweets snacks | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Savory or sweets snacks | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: 0.3 (95% CI: -1.0 to 1.7), p=NR  | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-127. Household selected food purchases continuous outcomes (other beverages) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | 100% juice         | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | 100% juice         | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 2.1 (95% CI: -1.3 to 5.5), p=NR  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | 100% juice         | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | 100% juice         | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -1.4 (95% CI: -5.8 to 2.9), p=NR  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | juice drinks       | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | juice drinks       | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: -0.3 (95% CI: -4.0 to 3.4), p=NR | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition        | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|---------------------------|------|--------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | juice drinks              | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | juice drinks              | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -1.3 (95% CI: -5.7 to 3.2), p=NR    | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Sugar sweetened beverages | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Sugar sweetened beverages | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: -4.3 (95% CI: -19.8 to 11.1), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Sugar sweetened beverages | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Sugar sweetened beverages | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -10.5 (95% CI: -30.1 to 9.1), p=NR  | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-128. Household selected food purchases continuous outcomes (refined grains) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition                               | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted rate/proportions                                     |
|------------------------|-----------|-------|----------|--|------|----------------------------------|--|--------------|-------------------------|--------------------------|---|
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Refined Grain Expenditure, 3 year pooled data    | NR   | Baseline: 2887<br>Followup: 2887 | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 10.26 (SD NR)    | \$           | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Refined Grain Expenditure, 3 year pooled data    | NR   | Baseline: 312<br>Followup: 312   | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 12.59 (SD NR)    | \$           | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Refined Grain Expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 10.67 (SD NR) | \$           | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Refined Grain Expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 13.08 (SD NR) | \$           | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Refined Grain Expenditure, after package change  | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 9.24 (SD NR)   | \$           | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition                               | Tool | N                                | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted rate/proportions                                     |
|------------------------|-----------|-------|----------|--|------|----------------------------------|---|--------------|-------------------------|--------------------------|---|
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Refined Grain Expenditure, after package change  | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 11.35 (SD NR)   | \$           | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Refined Grain Expenditure, 3 year pooled data    | NR   | Baseline: 2887<br>Followup: 2887 | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 91.52 (SD NR)     | ounces       | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Refined Grain Expenditure, 3 year pooled data    | NR   | Baseline: 312<br>Followup: 312   | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 105.74 (SD NR)    | ounces       | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Refined Grain Expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 95.83 (SD NR)  | ounces       | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Refined Grain Expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 111.84 (SD NR) | ounces       | NR                      | Comparator : NR          | Inverse probability weighted regression adjustment estimation |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition                              | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                                     |
|------------------------|--------------------|-------|-----------------------|---|------|--------------------------------|---|--------------|-------------------------|--|---|
| Oh, 2016 <sup>40</sup> | NR                 | Arm 1 | Non-WIC               | Refined Grain Expenditure, after package change | NR   | Baseline: NR<br>Followup: NR   | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 81.58 (SD NR) | ounces       | NR                      | Comparator : NR  | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR                 | Arm 2 | WIC                   | Refined Grain Expenditure, after package change | NR   | Baseline: NR<br>Followup: NR   | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 92.49 (SD NR) | ounces       | NR                      | Comparator : NR  | Inverse probability weighted regression adjustment estimation |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Refined grains                                  | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                                   | 0            | NR                      | Comparator : Ref   | Bonferroni-adjusted for multiple comparisons                  |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Refined grains                                  | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                                   | 0            | NR                      | Comparator : Arm1<br>Difference in difference early revision: -3 (95% CI: -4.6 to -1.4), p≤0.006 | Bonferroni-adjusted for multiple comparisons                  |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Refined grains                                  | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                                   | 0            | NR                      | Comparator : Ref   | Bonferroni-adjusted for multiple comparisons                  |

| Author, Year                | Sub-group         | Arm   | Arm Name                     | Outcome Definition  | Tool    | N                              | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|-----------------------------|-------------------|-------|------------------------------|---|---------|--------------------------------|--|-------------------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup>      | Late WIC revision | Arm 2 | WIC participation            | Refined grains  | NR      | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                  | 0                       | NR                      | Comparator : Arm1<br>Difference in difference late revision: - 4.3 (95% CI: -6.2 to -2.3), p≤0.006 | Bonferroni-adjusted for multiple comparisons |
| Stewart, 2019 <sup>44</sup> | No                | Arm 1 | Eligible, non-WIC households | Grain-ounce equivalents acquired in bread, refined grains       | FoodAPS | Baseline: 266<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 5.2 (SE 0.53)<br>Followup: NA  | Grain-ounce equivalents | Not reported            | Comparator : 2 vs. 1<br>Mean difference from baseline: - 1.01 (SE 0.71), p=NR                      | NR   |
| Stewart, 2019 <sup>44</sup> | No                | Arm 2 | WIC households               | Grain-ounce equivalents acquired in bread, refined grains       | FoodAPS | Baseline: 471<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 4.19 (SE 0.47)<br>Followup: NA | Grain-ounce equivalents | Not reported            | Comparator :   | NR   |
| Stewart, 2019 <sup>44</sup> | No                | Arm 1 | Eligible, non-WIC households | Grain-ounce equivalents acquired in cold cereal, refined grains | FoodAPS | Baseline: 266<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 1.05 (SE 0.2)<br>Followup: NA  | Grain-ounce equivalents | Not reported            | Comparator : 2 vs. 1<br>Mean difference from baseline: - 0.16 (SE 0.24), p=NR                      | NR   |

| Author, Year                | Sub-group | Arm   | Arm Name       | Outcome Definition  | Tool    | N                             | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted rate/proportions |
|-----------------------------|-----------|-------|----------------|---|---------|-------------------------------|--|-------------------------|-------------------------|--------------------------|---------------------------|
| Stewart, 2019 <sup>44</sup> | No        | Arm 2 | WIC households | Grain-ounce equivalents acquired in cold cereal, refined grains | FoodAPS | Baseline: 471<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 0.89 (SE 0.14)<br>Followup: NA | Grain-ounce equivalents | Not reported            | Comparator :             | NR                        |

CI=confidence interval; FoodAPS=National Household Food Acquisition and Purchase Survey ;n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-129. Household selected food purchases continuous outcomes (whole grains) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation during pregnancy**

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition                             | Tool | N                                | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference                                   | Adjusted rate/proportions |
|------------------------|-----------|-------|----------|--|------|----------------------------------|---|--------------|-------------------------|--|---------------------------|
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Whole Grain Expenditure, 3 year pooled data    | NR   | Baseline: 2887<br>Followup: 2887 | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 4.69 (SD NR)    | \$           | NR                      | Comparator: Ref  | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Whole Grain Expenditure, 3 year pooled data    | NR   | Baseline: 312<br>Followup: 312   | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 6.35 (SD NR)    | \$           | NR                      | Comparator: Arm1<br>Difference in mean: 1.66 (SD NR), p=NR | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Whole Grain Expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 4.79 (SD NR) | \$           | NR                      | Comparator: Ref  | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Whole Grain Expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 6.02 (SD NR) | \$           | NR                      | Comparator: Arm1<br>Difference in mean: 1.23 (SD NR), p=NR | Matching algorithm        |



| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition                            | Tool | N                                | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference                                  | Adjusted rate/proportions |
|------------------------|-----------|-------|----------|---|------|----------------------------------|---|--------------|-------------------------|---|---------------------------|
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Whole Grain Expenditure, after package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 4.4 (SD NR) | \$           | NR                      | Comparator: Ref   | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Whole Grain Expenditure, after package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 6.6 (SD NR) | \$           | NR                      | Comparator: Arm1<br>Difference in mean: 2.2 (SD NR), p=NR | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Whole Grain Expenditure, 3 year pooled data   | NR   | Baseline: 2887<br>Followup: 2887 | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 37.51 (SD NR) | ounces       | NR                      | Comparator: Ref   | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Whole Grain Expenditure, 3 year pooled data   | NR   | Baseline: 312<br>Followup: 312   | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 46.41 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Difference in mean: 8.9 (SD NR), p=NR | Matching algorithm        |

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition                             | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference                                    | Adjusted rate/proportions |
|------------------------|-----------|-------|----------|--|------|------------------------------|--|--------------|-------------------------|---|---------------------------|
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Whole Grain Expenditure, before package change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 38.45 (SD NR) | ounces       | NR                      | Comparator: Ref   | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Whole Grain Expenditure, before package change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 44.31 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Difference in mean: 5.86 (SD NR), p=NR  | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 1 | Non-WIC  | Whole Grain Expenditure, after package change  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 35.52 (SD NR)  | ounces       | NR                      | Comparator: Ref   | Matching algorithm        |
| Oh, 2016 <sup>40</sup> | NR        | Arm 2 | WIC      | Whole Grain Expenditure, after package change  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 48.65 (SD NR)  | ounces       | NR                      | Comparator: Arm1<br>Difference in mean: 13.13 (SD NR), p=NR | Matching algorithm        |

| Author, Year                | Sub-group          | Arm   | Arm Name                     | Outcome Definition                                      | Tool    | N                              | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|-----------------------------|--------------------|-------|------------------------------|---|---------|--------------------------------|--|-------------------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup>      | Early WIC revision | Arm 1 | Non-WIC participation        | Whole grains  | NR      | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                  | 0                       | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup>      | Early WIC revision | Arm 2 | WIC participation            | Whole grains  | NR      | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                  | 0                       | NR                      | Comparator: Arm1<br>Difference in difference early revision: 1.4 (95% CI: 0.4 to 2.4), p≤0.006 | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup>      | Late WIC revision  | Arm 1 | Non-WIC participation        | Whole grains  | NR      | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                  | 0                       | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup>      | Late WIC revision  | Arm 2 | WIC participation            | Whole grains  | NR      | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                  | 0                       | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.2 (95% CI: -1.3 to 1.0), p=NR   | Bonferroni-adjusted for multiple comparisons |
| Stewart, 2019 <sup>44</sup> | No                 | Arm 1 | Eligible, non-WIC households | Grain-ounce equivalents acquired in bread, whole grains | FoodAPS | Baseline: 266<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Mean 0.72 (SE 0.17)<br>Followup: NA | Grain-ounce equivalents | Not reported            | Comparator: 2 vs. 1<br>Mean difference from baseline: 0.61 (SE 0.28), p<0.05                   | NR   |

| Author, Year                | Sub-group | Arm   | Arm Name                     | Outcome Definition  | Tool    | N                             | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference   | Adjusted rate/proportions |
|-----------------------------|-----------|-------|------------------------------|---|---------|-------------------------------|--|-------------------------|-------------------------|--|---------------------------|
| Stewart, 2019 <sup>44</sup> | No        | Arm 2 | WIC households               | Grain-ounce equivalents acquired in bread, whole grains       | FoodAPS | Baseline: 471<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 1.33 (SE 0.22)<br>Followup: NA | Grain-ounce equivalents | Not reported            | Comparator:  | NR                        |
| Stewart, 2019 <sup>44</sup> | No        | Arm 1 | Eligible, non-WIC households | Grain-ounce equivalents acquired in cold cereal, whole grains | FoodAPS | Baseline: 266<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 0.8 (SE 0.14)<br>Followup: NA  | Grain-ounce equivalents | Not reported            | Comparator: 2 vs. 1<br>Mean difference from baseline: 0.09 (SE 0.22), p=NR | NR                        |
| Stewart, 2019 <sup>44</sup> | No        | Arm 2 | WIC households               | Grain-ounce equivalents acquired in cold cereal, whole grains | FoodAPS | Baseline: 471<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Mean 0.9 (SE 0.17)<br>Followup: NA  | Grain-ounce equivalents | Not reported            | Comparator:  | NR                        |

CI=confidence interval; FoodAPS=National Household Food Acquisition and Purchase Survey ;n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-130. Household selected food purchases continuous outcomes (fruits and vegetables) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition                    | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|---------------------------------------|------|--------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | FV with added sugar, fats, oils, salt | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | FV with added sugar, fats, oils, salt | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: -1.3 (95% CI: -3.2 to 0.6), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | FV with added sugar, fats, oils, salt | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | FV with added sugar, fats, oils, salt | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.7 (95% CI: -3.0 to 1.6), p=NR  | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition   | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|----------------------|------|--------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | FV with no additions | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | FV with no additions | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: -1.1 (95% CI: -3.5 to 1.4), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | FV with no additions | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | FV with no additions | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.7 (95% CI: -3.8 to 2.4), p=NR  | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; FV=fruits and vegetables; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-131. Household selected food purchases continuous outcomes (cereal) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition  | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|---------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Higher-sugar cereal | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Higher-sugar cereal | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.2 (95% CI: -0.6 to 1.0), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Higher-sugar cereal | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref  | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Higher-sugar cereal | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: -0.1 (95% CI: -1.1 to 0.8), p=NR | Bonferroni-adjusted for multiple comparisons |

| Author, Year           | Sub-group          | Arm   | Arm Name              | Outcome Definition | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted rate/proportions                    |
|------------------------|--------------------|-------|-----------------------|--------------------|------|--------------------------------|---|--------------|-------------------------|---|--|
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 1 | Non-WIC participation | Lower-sugar cereal | NR   | Baseline: 824<br>Followup: 824 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Early WIC revision | Arm 2 | WIC participation     | Lower-sugar cereal | NR   | Baseline: 716<br>Followup: 716 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference early revision: 0.6 (95% CI: 0.0 to 1.2), p=NR | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 1 | Non-WIC participation | Lower-sugar cereal | NR   | Baseline: 688<br>Followup: 688 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Ref   | Bonferroni-adjusted for multiple comparisons |
| Ng, 2018 <sup>39</sup> | Late WIC revision  | Arm 2 | WIC participation     | Lower-sugar cereal | NR   | Baseline: 587<br>Followup: 587 | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm1<br>Difference in difference late revision: 0.6 (95% CI: -0.1 to 1.3), p=NR | Bonferroni-adjusted for multiple comparisons |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-132. Household selected food purchases continuous outcomes (grain expenditure) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Subgroup | Arm   | Arm Name | Outcome Definition                             | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors   |
|------------------------|----------|-------|----------|--|------|----------------------------------|--|--------------|--------------------------|--------------------|
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Total grain expenditure, 3 year pooled data    | NR   | Baseline: 2887<br>Followup: 2887 | Followup<br>timepoint: 3 year pooled data<br>Outcome:<br>Baseline: NR<br>Followup: Mean 14.92 (SD NR)    | \$           | Comparator : NR          | Matching algorithm |
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Total grain expenditure, 3 year pooled data    | NR   | Baseline: 312<br>Followup: 312   | Followup<br>timepoint: 3 year pooled data<br>Outcome:<br>Baseline: NR<br>Followup: Mean 18.89 (SD NR)    | \$           | Comparator : NR          | Matching algorithm |
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Total grain expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup<br>timepoint: Before package change<br>Outcome:<br>Baseline: NR<br>Followup: Mean 15.47 (SD NR) | \$           | Comparator : NR          | Matching algorithm |
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Total grain expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup<br>timepoint: Before package change<br>Outcome:<br>Baseline: NR<br>Followup: Mean 19.1 (SD NR)  | \$           | Comparator : NR          | Matching algorithm |
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Total grain expenditure, after package change  | NR   | Baseline: NR<br>Followup: NR     | Followup<br>timepoint: After package change<br>Outcome:<br>Baseline: NR<br>Followup: Mean 13.64 (SD NR)  | \$           | Comparator : NR          | Matching algorithm |

| Author, Year           | Subgroup | Arm   | Arm Name | Outcome Definition                             | Tool | N                                | Followup Outcome  | Outcome Unit | Between-group Difference | Adjusted Factors   |
|------------------------|----------|-------|----------|--|------|----------------------------------|---|--------------|--------------------------|--------------------|
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Total grain expenditure, after package change  | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 17.95 (SD NR)   | \$           | Comparator : NR          | Matching algorithm |
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Total grain expenditure, 3 year pooled data    | NR   | Baseline: 2887<br>Followup: 2887 | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 128.74 (SD NR)    | ounces       | Comparator : NR          | Matching algorithm |
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Total grain expenditure, 3 year pooled data    | NR   | Baseline: 312<br>Followup: 312   | Followup timepoint: 3 year pooled data<br>Outcome: Baseline: NR<br>Followup: Mean 151.86 (SD NR)    | ounces       | Comparator : NR          | Matching algorithm |
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Total grain expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 133.98 (SD NR) | ounces       | Comparator : NR          | Matching algorithm |
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Total grain expenditure, before package change | NR   | Baseline: NR<br>Followup: NR     | Followup timepoint: Before package change<br>Outcome: Baseline: NR<br>Followup: Mean 155.86 (SD NR) | ounces       | Comparator : NR          | Matching algorithm |

| Author, Year           | Subgroup | Arm   | Arm Name | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Between-group Difference   | Adjusted Factors  |
|------------------------|----------|-------|----------|---|------|------------------------------|--|--------------|--|---|
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Total grain expenditure, after package change                       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 116.83 (SD NR) | ounces       | Comparator : NR  | Matching algorithm  |
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Total grain expenditure, after package change                       | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: After package change<br>Outcome: Baseline: NR<br>Followup: Mean 140.83 (SD NR) | ounces       | Comparator : NR  | Matching algorithm  |
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Difference in average expenditures on Whole Grain, 3 year total     | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                                    | NR           | Comparator : Ref   | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Difference in average expenditures on Whole Grain, 3 year total     | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                                    | NR           | Comparator : Arm1<br>Difference in average expenditure : 1.104 (SE 0.3371), p=0.01 | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Difference in Average Whole Grain Expenditure before package change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR                                    | \$           | Comparator : Ref   | Inverse probability weighted regression adjustment estimation |

| Author, Year           | Subgroup | Arm   | Arm Name | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Between-group Difference  | Adjusted Factors  |
|------------------------|----------|-------|----------|---|------|------------------------------|--|--------------|---|---|
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Difference in Average Whole Grain Expenditure before package change       | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | \$           | Comparator : Arm1<br>Difference in average expenditure : 0.7841 (SE 0.3484), p=0.05           | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Difference in Average Whole Grain Expenditure after package change        | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | \$           | Comparator : Ref  | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Difference in Average Whole Grain Expenditure after package change        | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | \$           | Comparator : Arm1<br>Difference in average expenditure : 1.553 (SE 0.3692), p=0.01            | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR       | Arm 1 | Non-WIC  | Difference in difference Average Whole Grain Expenditure over WIC package | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | \$           | Comparator : Ref  | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | NR       | Arm 2 | WIC      | Difference in difference Average Whole Grain Expenditure over WIC package | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | \$           | Comparator : Arm1<br>Difference in difference average expenditure : 0.769 (SE 0.2681), p=0.01 | Inverse probability weighted regression adjustment estimation |

| Author, Year           | Subgroup                       | Arm   | Arm Name | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Between-group Difference   | Adjusted Factors  |
|------------------------|--------------------------------|-------|----------|---|------|------------------------------|--|--------------|--|---|
| Oh, 2016 <sup>40</sup> | Households with young children | Arm 1 | Non-WIC  | Difference in average expenditures on Whole Grain, 3 year total     | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | Comparator : Ref   | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | Households with young children | Arm 2 | WIC      | Difference in average expenditures on Whole Grain, 3 year total     | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | NR           | Comparator : Arm1<br>Difference in average expenditure : 1.136 (SE 0.3985), p=0.01 | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | Households with young children | Arm 1 | Non-WIC  | Difference in Average Whole Grain Expenditure before package change | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | \$           | Comparator : Ref   | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | Households with young children | Arm 2 | WIC      | Difference in Average Whole Grain Expenditure before package change | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | \$           | Comparator : Arm1<br>Difference in average expenditure : 0.687 (SE 0.4128), p=0.1  | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | Households with young children | Arm 1 | Non-WIC  | Difference in Average Whole Grain Expenditure after package change  | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: NR<br>Baseline: NR<br>Followup: NR | \$           | Comparator : Ref   | Inverse probability weighted regression adjustment estimation |

| Author, Year           | Subgroup                       | Arm   | Arm Name | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Between-group Difference  | Adjusted Factors  |
|------------------------|--------------------------------|-------|----------|---|------|------------------------------|--|--------------|---|---|
| Oh, 2016 <sup>40</sup> | Households with young children | Arm 2 | WIC      | Difference in Average Whole Grain Expenditure after package change        | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | \$           | Comparator : Arm1<br>Difference in average expenditure : 1.792 (SE 0.4459), p=0.01            | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | Households with young children | Arm 1 | Non-WIC  | Difference in difference Average Whole Grain Expenditure over WIC package | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | \$           | Comparator : Ref  | Inverse probability weighted regression adjustment estimation |
| Oh, 2016 <sup>40</sup> | Households with young children | Arm 2 | WIC      | Difference in difference Average Whole Grain Expenditure over WIC package | NR   | Baseline: NR<br>Followup: NR | Followup<br>timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | \$           | Comparator : Arm1<br>Difference in difference average expenditure : 1.104 (SE 0.3357), p=0.01 | Inverse probability weighted regression adjustment estimation |

CI=confidence interval;n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-133. Household WIC eligible food purchases categorical outcomes (grains) of studies investigating Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup | Arm   | Arm Name                     | Outcome Definition    | Tool    | N at Analysis | Followup Outcome, n(%)             | Between-group Difference | Adjusted Factors |
|-----------------------------|----------|-------|------------------------------|-----------------------|---------|---------------|------------------------------------|--------------------------|------------------|
| Stewart, 2019 <sup>44</sup> | No       | Arm 1 | Eligible, non-WIC households | Purchased bread       | FoodAPS | 266           | Followup timepoint: NA<br>151 (NR) | Comparator: NR           | NR               |
| Stewart, 2019 <sup>44</sup> | No       | Arm 2 | WIC households               | Purchased bread       | FoodAPS | 471           | Followup timepoint: NA<br>273 (NR) | Comparator: NR           | NR               |
| Stewart, 2019 <sup>44</sup> | No       | Arm 1 | Eligible, non-WIC households | Purchased cold cereal | FoodAPS | 266           | Followup timepoint: NA<br>100 (NR) | Comparator: NR           | NR               |
| Stewart, 2019 <sup>44</sup> | No       | Arm 2 | WIC households               | Purchased cold cereal | FoodAPS | 471           | Followup timepoint: NA<br>153 (NR) | Comparator: NR           | NR               |

FoodAPS=National Household Food Acquisition and Purchase Survey; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-134. Household WIC eligible food purchases continuous outcomes (grains) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                  | Sub-group         | Arm   | Arm Name                | Outcome Definition             | Tool | N                                | Followup Outcome  | Outcome Unit | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-------------------|-------|-------------------------|--------------------------------|------|----------------------------------|---|--------------|---|--|
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 1 | Pre-WIC, WIC household  | White bread                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 59.5 (SD NR) | ounces       | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 2 | Post-WIC, WIC household | White bread                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 52.7 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 0.885 (95% CI: 0.863, 0.908), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 1 | Pre-WIC, WIC household  | Bread with 1%–50% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 8.6 (SD NR)  | ounces       | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |



| Author, Year                  | Sub-group         | Arm   | Arm Name                | Outcome Definition              | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-------------------|-------|-------------------------|---------------------------------|------|----------------------------------|--|--------------|---|--|
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 2 | Post-WIC, WIC household | Bread with 1%–50% whole grains  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 7.5 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 0.879 (95% CI: 0.830, 0.931), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 1 | Pre-WIC, WIC household  | Bread with 50%–99% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 2.1 (SD NR) | ounces       | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 2 | Post-WIC, WIC household | Bread with 50%–99% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 2 (SD NR)   | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 0.978 (95% CI: 0.864, 1.108), p=NS    | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group         | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome  | Outcome Unit | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-------------------|-------|-------------------------|------------------------|------|----------------------------------|---|--------------|--|--|
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 1 | Pre-WIC, WIC household  | 100% whole-grain bread | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 6.3 (SD NR)  | ounces       | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 2 | Post-WIC, WIC household | 100% whole-grain bread | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 19.6 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 3.119 (95% CI: 2.850, 3.413), $p \leq 0.001$ | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 1 | Pre-WIC, WIC household  | White rice             | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 5.5 (SD NR)  | ounces       | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group         | Arm   | Arm Name                | Outcome Definition | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-------------------|-------|-------------------------|--------------------|------|----------------------------------|--|--------------|--|--|
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 2 | Post-WIC, WIC household | White rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 5.7 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 1.034 (95% CI: 0.872, 1.226), p=NS     | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 1 | Pre-WIC, WIC household  | Brown rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 0.3 (SD NR) | ounces       | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | All payment types | Arm 2 | Post-WIC, WIC household | Brown rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 2.4 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 8.376 (95% CI: 6.621, 10.596), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group       | Arm   | Arm Name                | Outcome Definition             | Tool | N                                | Followup Outcome  | Outcome Unit | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------------|-------|-------------------------|--------------------------------|------|----------------------------------|---|--------------|---|--|
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 1 | Pre-WIC, WIC household  | White bread                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 59.5 (SD NR) | ounces       | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 2 | Post-WIC, WIC household | White bread                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 52.7 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 0.885 (95% CI: 0.863, 0.908), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 1 | Pre-WIC, WIC household  | Bread with 1%–50% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 8.6 (SD NR)  | ounces       | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group       | Arm   | Arm Name                | Outcome Definition              | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------------|-------|-------------------------|---------------------------------|------|----------------------------------|--|--------------|---|--|
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 2 | Post-WIC, WIC household | Bread with 1%–50% whole grains  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 7.1 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 0.823 (95% CI: 0.776, 0.873), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 1 | Pre-WIC, WIC household  | Bread with 50%–99% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 2.1 (SD NR) | ounces       | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 2 | Post-WIC, WIC household | Bread with 50%–99% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 1.5 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 0.735 (95% CI: 0.647, 0.836), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group       | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------------|-------|-------------------------|------------------------|------|----------------------------------|--|--------------|--|--|
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 1 | Pre-WIC, WIC household  | 100% whole-grain bread | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 6.2 (SD NR) | ounces       | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 2 | Post-WIC, WIC household | 100% whole-grain bread | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 4.9 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 0.786 (95% CI: 0.725, 0.852), $p \leq 0.001$ | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 1 | Pre-WIC, WIC household  | White rice             | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 5.5 (SD NR) | ounces       | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group       | Arm   | Arm Name                | Outcome Definition | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------------|-------|-------------------------|--------------------|------|----------------------------------|--|--------------|--|--|
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 2 | Post-WIC, WIC household | White rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 5.7 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 1.034 (95% CI: 0.872, 1.226), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 1 | Pre-WIC, WIC household  | Brown rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Marginal mean 0.3 (SD NR) | ounces       | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2013 <sup>53</sup> | Non-WIC payment | Arm 2 | Post-WIC, WIC household | Brown rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Marginal mean 0.3 (SD NR) | ounces       | Comparator: Arm2<br>Exponentiated coefficients: 0.997 (95% CI: 0.772, 1.288), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|--------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | Total bread        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | Total bread        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 15 (SD 19.8)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | Total bread        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 74.8 (SD 90.6)        | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | Total bread        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 77.2 (SD 82.8)        | Ounces per household per month | Comparator: NR           | NR               |



| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|------------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | 100% whole-grain bread | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | 100% whole-grain bread | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 14.1 (SD 19.4)        | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | 100% whole-grain bread | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 6 (SD 21.8)           | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | 100% whole-grain bread | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 18.5 (SD 26.6)        | Ounces per household per month | Comparator: NR           | NR               |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition              | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|---------------------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | Bread with 51%–99% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | Bread with 51%–99% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.5 (SD 3.5)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | Bread with 51%–99% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 2.1 (SD 10.9)         | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | Bread with 51%–99% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2 (SD 9)              | Ounces per household per month | Comparator: NR           | NR               |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition             | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|--------------------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | Bread with 1%–50% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | Bread with 1%–50% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.5 (SD 3.4)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | Bread with 1%–50% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 8.6 (SD 22)           | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | Bread with 1%–50% whole grains | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 7.1 (SD 19.5)         | Ounces per household per month | Comparator: NR           | NR               |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|--------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | White bread        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | White bread        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | White bread        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 58.1 (SD 78.7)        | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | White bread        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 49.7 (SD 68.2)        | Ounces per household per month | Comparator: NR           | NR               |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|--------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | Total rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | Total rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2.1 (SD 7.5)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | Total rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 5.4 (SD 43.1)         | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | Total rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 7.7 (SD 52.5)         | Ounces per household per month | Comparator: NR           | NR               |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|--------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | Brown rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | Brown rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2.1 (SD 7.5)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | Brown rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SD 3.5)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | Brown rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2.4 (SD 8.1)          | Ounces per household per month | Comparator: NR           | NR               |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|--------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | White rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | White rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | White rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 5.1 (SD 42.8)         | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | White rice         | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 5.3 (SD 51.8)         | Ounces per household per month | Comparator: NR           | NR               |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|--------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | Total tortilla     | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | Total tortilla     | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SD 2.5)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | Total tortilla     | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD 5.3)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | Total tortilla     | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.1 (SD 5.4)          | Ounces per household per month | Comparator: NR           | NR               |



| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition   | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|----------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | Whole wheat tortilla | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | Whole wheat tortilla | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SD 2.5)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | Whole wheat tortilla | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD 2.4)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | Whole wheat tortilla | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.4 (SD 3.3)          | Ounces per household per month | Comparator: NR           | NR               |

| Author, Year                  | Sub-group            | Arm   | Arm Name                | Outcome Definition   | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference | Adjusted Factors |
|-------------------------------|----------------------|-------|-------------------------|----------------------|------|----------------------------------|---|--------------------------------|--------------------------|------------------|
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC, WIC household  | White flour tortilla | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | Paid by WIC benefits | Arm 2 | Post-WIC, WIC household | White flour tortilla | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean Not available (SD NR) | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 1 | Pre-WIC, WIC household  | White flour tortilla | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.7 (SD 4.3)          | Ounces per household per month | Comparator: NR           | NR               |
| Andreyeva, 2013 <sup>53</sup> | All payment types    | Arm 2 | Post-WIC, WIC household | White flour tortilla | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.7 (SD 4.2)          | Ounces per household per month | Comparator: NR           | NR               |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-135. Household WIC eligible food purchases continuous outcomes (beverages) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                  | Sub-group            | Arm   | Arm Name                                    | Outcome Definition | Tool | N                                | Followup Outcome   | Outcome Unit                   | Between-group Difference  | Adjusted Factors  |
|-------------------------------|----------------------|-------|---|--------------------|------|----------------------------------|--|--------------------------------|---|---|
| Andreyeva, 2013 <sup>54</sup> | All payment types    | Arm 1 | Pre-WIC food package change, WIC household  | 100% fruit juic    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 236 (SD 228) | Ounces per household per month | Comparator: Arm 1   | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | All payment types    | Arm 2 | Post-WIC food package change, WIC household | 100% fruit juice   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 174 (SD 202) | Ounces per household per month | Comparator: Arm 2<br>Exponentiated coefficients: 0.765 (95% CI: 0.746 to 0.786 ), p≤0.001 | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Paid by WIC benefits | Arm 1 | Pre-WIC food package change, WIC household  | 100% fruit juice   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 155 (SD 151) | Ounces per household per month | Comparator: Arm 1   | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |

| Author, Year                  | Sub-group            | Arm   | Arm Name                                   | Outcome Definition | Tool | N                                | Followup Outcome  | Outcome Unit                   | Between-group Difference  | Adjusted Factors  |
|-------------------------------|----------------------|-------|--|--------------------|------|----------------------------------|---|--------------------------------|---|---|
| Andreyeva, 2013 <sup>54</sup> | Paid by WIC benefits | Arm 2 | Pre-WIC food package change, WIC household | 100% fruit juice   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 84 (SD 93)  | Ounces per household per month | Comparator: Arm 2<br>Exponentiated coefficients: 0.565 (95% CI: 0.549 to 0.581 ), p≤0.001 | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment      | Arm 1 | Pre-WIC food package change, WIC household | 100% fruit juice   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 48 (SD 126) | Ounces per household per month | Comparator: Arm 1   | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment      | Arm 2 | Pre-WIC food package change, WIC household | 100% fruit juice   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 49 (SD 131) | Ounces per household per month | Comparator: Arm 2<br>Exponentiated coefficients: 1.136 (95% CI: 1.084 to 1.190 ), p≤0.001 | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment      | Arm 1 | Pre-WIC food package change, WIC household | Fruit drinks       | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 72 (SD 174) | Ounces per household per month | Comparator: Arm 1   | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |

| Author, Year                  | Sub-group       | Arm   | Arm Name                                   | Outcome Definition | Tool | N                                | Followup Outcome   | Outcome Unit                   | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------------|-------|--|--------------------|------|----------------------------------|--|--------------------------------|--|---|
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment | Arm 2 | Pre-WIC food package change, WIC household | Fruit drinks       | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 84 (SD 188)  | Ounces per household per month | Comparator: Arm 2<br>Exponentiated coefficients: 1.209 (95% CI: 1.149 to 1.273 ), p=NR | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment | Arm 1 | Pre-WIC food package change, WIC household | Soft drinks        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 277 (SD 469) | Ounces per household per month | Comparator: Arm 1  | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment | Arm 2 | Pre-WIC food package change, WIC household | Soft drinks        | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 236 (SD 432) | Ounces per household per month | Comparator: Arm 2<br>Exponentiated coefficients: 0.879 (95% CI: 0.850 to 0.909 ), p=NR | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment | Arm 1 | Pre-WIC food package change, WIC household | Bottled water      | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 122 (SD 334) | Ounces per household per month | Comparator: Arm 1  | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |

| Author, Year                  | Sub-group       | Arm   | Arm Name                                   | Outcome Definition | Tool | N                                | Followup Outcome   | Outcome Unit                   | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------------|-------|--|--------------------|------|----------------------------------|--|--------------------------------|--|---|
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment | Arm 2 | Pre-WIC food package change, WIC household | Bottled water      | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 101 (SD 286) | Ounces per household per month | Comparator: Arm 2<br>Exponentiated coefficients: 0.864 (95% CI: 0.813 to 0.918 ), p=NR | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment | Arm 1 | Pre-WIC food package change, WIC household | New age beverages  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 76 (SD 244)  | Ounces per household per month | Comparator: Arm 1  | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |
| Andreyeva, 2013 <sup>54</sup> | Non-WIC payment | Arm 2 | Pre-WIC food package change, WIC household | New age beverages  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 89 (SD 330)  | Ounces per household per month | Comparator: Arm 2<br>Exponentiated coefficients: 1.213 (95% CI: 1.121 to 1.312 ), p=NR | Adjusted with model accounting for WIC period, state, SNAP participation, receipt of cash assistance, total grocery expenditure, month of purchase, store level socio-demographic variables |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-136. Household WIC eligible food purchases continuous outcomes (diary) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition           | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|------------------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Total milk - total purchases | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 503 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Total milk - total purchases | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 431 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.858 (95% CI: 0.816-0.901), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |



| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                  | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|-------------------------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Total milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 375 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Total milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 302 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.805 (95% CI: 0.756-0.857), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Total milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 126 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                  | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|-------------------------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Total milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 127 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.008 (95% CI: 0.904-1.123), p=NS    | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Whole milk - total purchases        | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 280 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Whole milk - total purchases        | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 142 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.506 (95% CI: 0.449-0.571), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                  | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|-------------------------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Whole milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 205 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Whole milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 75 (SD NR)  | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.368 (95% CI: 0.315-0.429), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Whole milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 73 (SD NR)  | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                  | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|-------------------------------------|------|--------------------------------|---|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Whole milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 62 (SD NR)  | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.858 (95% CI: 0.735-1.002), p=NS    | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Reduced fat milk - total purchases  | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 110 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Reduced fat milk - total purchases  | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 172 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.562 (95% CI: 1.334-1.829), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                        | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|---|------|--------------------------------|---|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Reduced fat milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 82 (SD NR)  | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Reduced fat milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 142 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.721 (95% CI: 1.435-2.064), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Reduced fat milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 27 (SD NR)  | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                        | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|---|------|--------------------------------|---|--------------|-------------------------|---|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Reduced fat milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 29 (SD NR)  | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.085 (95% CI: 0.864-1.364), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Low fat milk - total purchases            | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 97 (SD NR)  | ounces       | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Low fat milk - total purchases            | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 101 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.043 (95% CI: 0.902-1.204), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                    | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|---------------------------------------|------|--------------------------------|--|--------------|-------------------------|---|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Low fat milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 76 (SD NR) | ounces       | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Low fat milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 72 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.953 (95% CI: 0.797-1.140), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Low fat milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 20 (SD NR) | ounces       | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                    | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|---------------------------------------|------|--------------------------------|--|--------------|-------------------------|---|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Low fat milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 28 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.372 (95% CI: 1.107-1.700), p≤0.01 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Nonfat milk - total purchases         | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 18 (SD NR) | ounces       | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Nonfat milk - total purchases         | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 22 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.22 (95% CI: 0.922-1.615), p=NS    | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |



| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                   | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|--------------------------------------|------|--------------------------------|--|--------------|-------------------------|---|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Nonfat milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 13 (SD NR) | ounces       | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Nonfat milk - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 14 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.126 (95% CI: 0.761-1.664), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Nonfat milk - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 4 (SD NR)  | ounces       | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                    | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|---------------------------------------|------|--------------------------------|--|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | Nonfat milk - purchased with non-WIC  | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 6 (SD NR)  | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.536 (95% CI: 0.981-2.404), p=NS    | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | WIC eligible cheese - total purchases | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 21 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | WIC eligible cheese - total purchases | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 15 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.628 (95% CI: 0.588-0.670), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                           | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|--|------|--------------------------------|--|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | WIC eligible cheese - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 14 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | WIC eligible cheese - purchased with WIC     | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3 (SD NR)  | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.228 (95% CI: 0.195-0.265), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | WIC eligible cheese - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 10 (SD NR) | ounces       | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                           | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|--|------|--------------------------------|--|--------------|-------------------------|--|--|
| Andreyeva, 2014 <sup>55</sup> | NR        | Arm 2 | Post-WIC, WIC household | WIC eligible cheese - purchased with non-WIC | NR   | Baseline: 515<br>Followup: 515 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 12 (SD NR) | ounces       | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.171 (95% CI: 1.082-1.266), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-137. Household WIC eligible food purchases continuous outcomes (fruits) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|------------------------|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3036.6 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3684.7 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 311.3 (SD NR)  | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 314.1 (SD NR)  | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|------------------------|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 19.8 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 28.3 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 25.5 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 28.3 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3393.2 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4055.4 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)      | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 976.4 (SD NR)  | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                       | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 42.4 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 8.5 (SD NR)  | grams        | NR                      | Comparator: NR           | NR               |



| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)      | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)      | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)      | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1027.3 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|------------------------|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3234.7 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3882.8 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 376.4 (SD NR)  | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 302.8 (SD NR)  | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|------------------------|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 19.8 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 19.8 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 28.3 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 19.8 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|---|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3659.2 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4225.2 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)      | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1038.6 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                       | Tool | N                                | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|---|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 5.7 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2.8 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|---|------|----------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)      | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)      | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)      | grams        | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1047.1 (SD NR) | grams        | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|------------------------|------|----------------------------------|--|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 15 (SD NR)     | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 18.4 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1.3 (SD NR)    | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.30.1 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|------------------------|------|----------------------------------|--|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SD NR)  | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SD NR)  | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 16.7 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |



| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|--|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 20.1 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 4.9 (SD NR)  | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                       | Tool | N                                | Followup Outcome  | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|---|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome  | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|---|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 5.1 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|------------------------|------|----------------------------------|--|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 16 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 19.5 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1.6 (SD NR)  | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.3 (SD NR)  | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome  | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|------------------------|------|----------------------------------|---|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome   | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|---|------|----------------------------------|--|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 18 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 21.1 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 5.4 (SD NR)  | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                       | Tool | N                                | Followup Outcome  | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|---|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome  | Outcome Unit            | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|---|------|----------------------------------|---|-------------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 5.4 (SD NR) | Cup-equivalent servings | NR                      | Comparator: NR           | NR               |



| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|------------------------|------|----------------------------------|---|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 9.5 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 12 (SD NR)  | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.8 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|------------------------|------|----------------------------------|---|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome   | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|--|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 10.6 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 13.4 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3.1 (SD NR)  | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                       | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|---|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group     | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|---|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3.3 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome   | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|------------------------|------|----------------------------------|--|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 10 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 12.7 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD NR)  | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD NR)  | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition     | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|------------------------|------|----------------------------------|---|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried fruit purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome   | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|---|------|----------------------------------|--|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 11.3 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total fruit purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 13.9 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3.3 (SD NR)  | Expenditures, \$ | NR                      | Comparator: NR           | NR               |



| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                       | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|---|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group   | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-------------|-------|-------------------------|---|------|----------------------------------|---|------------------|-------------------------|--------------------------|------------------|
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | NR                      | Comparator: NR           | NR               |
| Andreyeva, 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total fruit purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3.3 (SD NR) | Expenditures, \$ | NR                      | Comparator: NR           | NR               |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition      | Tool | N                                | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|-------------------------|------|----------------------------------|--|-----------------|-------------------------|---|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Fresh fruits purchased  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3198 (SD NR) | Grams purchased | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Fresh fruits purchased  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4104 (SD NR) | Grams purchased | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.286 (95% CI: 1.238, 1.335), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Canned fruits purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 311 (SD NR)  | Grams purchased | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition      | Tool | N                                | Followup Outcome  | Outcome Unit    | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|-------------------------|------|----------------------------------|---|-----------------|-------------------------|--|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Canned fruits purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 311 (SD NR)           | Grams purchased | NR                      | Comparator: Arm2<br>Exponentiated coefficients: 0.984 (95% CI: 0.915, 1.057), p=NS                     | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Frozen fruits purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not estimated (SD NR) | Grams purchased | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Frozen fruits purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean Not estimated (SD NR) | Grams purchased | NR                      | Comparator: Arm2<br>Exponentiated coefficients: Not estimated (95% CI: Not estimated), p=Not estimated | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                        | Tool | N                                | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|---|------|----------------------------------|--|-----------------|-------------------------|---|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | All fruits purchased                      | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3594 (SD NR) | Grams purchased | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | All fruits purchased                      | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4528 (SD NR) | Grams purchased | NR                      | Comparator: Arm2<br>Exponentiated coefficients: 1.259 (95% CI: 1.215, 1.306), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Fresh fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3198 (SD NR) | Grams purchased | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                         | Tool | N                                | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|--|------|----------------------------------|--|-----------------|-------------------------|---|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Fresh fruits purchased with non-WIC funds  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3056 (SD NR) | Grams purchased | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.956 (95% CI: 0.920, 0.993), p≤0.05  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Canned fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 311 (SD NR)  | Grams purchased | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Canned fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 283 (SD NR)  | Grams purchased | NR                      | Comparator: Arm2<br>Exponentiated coefficients: 0.879 (95% CI: 0.817, 0.946), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                         | Tool | N                                | Followup Outcome  | Outcome Unit    | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|--|------|----------------------------------|---|-----------------|-------------------------|--|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Frozen fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not estimated (SD NR) | Grams purchased | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Frozen fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean Not estimated (SD NR) | Grams purchased | NR                      | Comparator: Arm2<br>Exponentiated coefficients: Not estimated (95% CI: Not estimated), p=Not estimated | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | All fruits purchased with non-WIC funds    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3622 (SD NR)          | Grams purchased | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|---|------|----------------------------------|---|------------------|-------------------------|---|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | All fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3424 (SD NR)  | Grams purchased  | NR                      | Comparator: Arm2<br>Exponentiated coefficients: 0.95 (95% CI: 0.916, 0.986), p≤0.01   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Fresh fruits purchased                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 10.31 (SD NR) | Expenditures, \$ | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Fresh fruits purchased                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 13.43 (SD NR) | Expenditures, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 1.303 (95% CI: 1.268, 1.339), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |



| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition      | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|-------------------------|------|----------------------------------|---|------------------|-------------------------|--|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Canned fruits purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.84 (SD NR)  | Expenditures, \$ | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Canned fruits purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.92 (SD NR)  | Expenditures, \$ | NR                      | Comparator: Arm2<br>Exponentiated coefficients: 1.095 (95% CI: 1.022, 1.174), p≤0.05 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Frozen fruits purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 11.89 (SD NR) | Expenditures, \$ | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition      | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|-------------------------|------|----------------------------------|---|------------------|-------------------------|--|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Frozen fruits purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean Not estimated (SD NR) | Expenditures, \$ | NR                      | Comparator: Arm2<br>Exponentiated coefficients: Not estimated (95% CI: Not estimated), p=Not estimated | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | All fruits purchased    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not estimated (SD NR) | Expenditures, \$ | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | All fruits purchased    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 14.65 (SD NR)         | Expenditures, \$ | NR                      | Comparator: Arm2<br>Exponentiated coefficients: 1.233 (95% CI: 1.193, 1.274), p≤0.001                  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                         | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|--|------|----------------------------------|---|------------------|-------------------------|---|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Fresh fruits purchased with non-WIC funds  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 10.34 (SD NR) | Expenditures, \$ | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Fresh fruits purchased with non-WIC funds  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 10.13 (SD NR) | Expenditures, \$ | NR                      | Comparator: Arm1<br>Exponentiated coefficients: 0.98 (95% CI: 0.953, 1.007), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Canned fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.84 (SD NR)  | Expenditures, \$ | NR                      | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                         | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|--|------|----------------------------------|---|------------------|-------------------------|--|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Canned fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.83 (SD NR)          | Expenditures, \$ | NR                      | Comparator: Arm2<br>Exponentiated coefficients: 0.981 (95% CI: 0.915, 1.052), p=NS                     | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | Frozen fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean Not estimated (SD NR) | Expenditures, \$ | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | Frozen fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean Not estimated (SD NR) | Expenditures, \$ | NR                      | Comparator: Arm2<br>Exponentiated coefficients: Not estimated (95% CI: Not estimated), p=Not estimated | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                  | Sub-group | Arm   | Arm Name                | Outcome Definition                      | Tool | N                                | Followup Outcome  | Outcome Unit     | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-------------------------------|-----------|-------|-------------------------|---|------|----------------------------------|---|------------------|-------------------------|--|--|
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 1 | Pre-WIC, WIC household  | All fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 11.93 (SD NR) | Expenditures, \$ | NR                      | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva, 2015 <sup>56</sup> | NR        | Arm 2 | Post-WIC, WIC household | All fruits purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 11.27 (SD NR) | Expenditures, \$ | NR                      | Comparator: Arm2<br>Exponentiated coefficients: 0.945 (95% CI: 0.914, 0.976), p≤0.01 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-138. Household WIC eligible food purchases continuous outcomes (vegetables) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition         | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|----------------------------|------|----------------------------------|--|--------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 2164.9 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2278.2 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1550.8 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1610.3 (SD NR) | grams        | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition         | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|----------------------------|------|----------------------------------|--|--------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 305.6 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 413.2 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 48.1 (SD NR)   | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 31.1 (SD NR)   | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 4069.5 (SD NR) | grams        | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|--|--------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total vegetable purchases                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4332.7 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 28.3 (SD NR)   | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 348.1 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 14.2 (SD NR)   | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 322.6 (SD NR)  | grams        | Comparator: NR           | NR               |



| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome  | Outcome Unit | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|---|--------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)     | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 141.5 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 39.6 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 25.5 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 82.1 (SD NR)  | grams        | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                          | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|--|--------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 837.7 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 2258.3 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2391.4 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1839.5 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1635.7 (SD NR) | grams        | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition         | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|----------------------------|------|----------------------------------|--|--------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 461.3 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 478.3 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 62.3 (SD NR)   | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 62.3 (SD NR)   | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 4621.4 (SD NR) | grams        | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|--|--------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total vegetable purchases                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4567.6 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 19.8 (SD NR)   | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 308.5 (SD NR)  | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 16.9 (SD NR)   | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 28.3 (SD NR)   | grams        | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome   | Outcome Unit | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|--|--------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 73.6 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 48.1 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 53.8 (SD NR) | grams        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 84.9 (SD NR) | grams        | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                          | Tool | N                                | Followup Outcome  | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|---|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 2 | Post-WIC, WIC household | Total vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 464.1 (SD NR) | grams                   | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 13.7 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 13.8 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 6.5 (SD NR)   | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 6.7 (SD NR)   | Cup-equivalent servings | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition         | Tool | N                                | Followup Outcome   | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|----------------------------|------|----------------------------------|--|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1.8 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2.4 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.6 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.4 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 22.6 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome   | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|--|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total vegetable purchases                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 23.3 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2 (SD NR)    | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.3 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |



| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome  | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|---|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.8 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.5 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.8 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                          | Tool | N                                | Followup Outcome   | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|--|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4.4 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 14.6 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 14.8 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 7.7 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 7 (SD NR)    | Cup-equivalent servings | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition         | Tool | N                                | Followup Outcome   | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|----------------------------|------|----------------------------------|--|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 2.7 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2.8 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 25.9 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome   | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|--|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total vegetable purchases                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 25.5 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.9 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR)  | Cup-equivalent servings | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome  | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|---|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.4 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.7 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.7 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                          | Tool | N                                | Followup Outcome  | Outcome Unit            | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|---|-------------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 2 | Post-WIC, WIC household | Total vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3.2 (SD NR) | Cup-equivalent servings | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 7.1 (SD NR) | Expenditures, \$        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 7.8 (SD NR) | Expenditures, \$        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3.8 (SD NR) | Expenditures, \$        | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4 (SD NR)   | Expenditures, \$        | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition         | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|----------------------------|------|----------------------------------|--|------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.2 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 11.9 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|--|------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total vegetable purchases                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 13.2 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.9 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.7 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |



| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome  | Outcome Unit     | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|--|------|----------------------------------|---|------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.4 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |

| Author, Year                   | Subgroup      | Arm   | Arm Name                | Outcome Definition                          | Tool | N                                | Followup Outcome  | Outcome Unit     | Between-group Difference | Adjusted Factors |
|--------------------------------|---------------|-------|-------------------------|---|------|----------------------------------|---|------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Massachusetts | Arm 2 | Post-WIC, WIC household | Total vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2.1 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 8.1 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases                   | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 9.2 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 4.6 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut   | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4.3 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition         | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|----------------------------|------|----------------------------------|--|------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1.3 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.3 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 14.2 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|--|------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total vegetable purchases                    | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 14.9 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)    | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Fresh vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1 (SD NR)    | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Canned vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR)  | Expenditures, \$ | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition                           | Tool | N                                | Followup Outcome  | Outcome Unit     | Between-group Difference | Adjusted Factors |
|--------------------------------|-------------|-------|-------------------------|--|------|----------------------------------|---|------------------|--------------------------|------------------|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0 (SD NR)   | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Frozen vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.2 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Dried vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 0.1 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 1 | Pre-WIC, WIC household  | Total vegetable purchases with WIC benefits  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 0.3 (SD NR) | Expenditures, \$ | Comparator: NR           | NR               |

| Author, Year                   | Subgroup    | Arm   | Arm Name                | Outcome Definition                          | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference  | Adjusted Factors   |
|--------------------------------|-------------|-------|-------------------------|---|------|----------------------------------|--|------------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | Connecticut | Arm 2 | Post-WIC, WIC household | Total vegetable purchases with WIC benefits | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.4 (SD NR)  | Expenditures, \$ | Comparator: NR  | NR   |
| Andreyeva , 2015 <sup>56</sup> | NR          | Arm 1 | Pre-WIC, WIC household  | Fresh vegetables purchased                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 2151 (SD NR) | Grams purchased  | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR          | Arm 2 | Post-WIC, WIC household | Fresh vegetables purchased                  | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2519 (SD NR) | Grams purchased  | Comparator: Arm1<br>Exponentiated coefficients: 1.175 (95% CI: 1.127, 1.225), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition          | Tool | N                                | Followup Outcome   | Outcome Unit    | Between-group Difference   | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|-----------------------------|------|----------------------------------|--|-----------------|--|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Canned vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1641 (SD NR) | Grams purchased | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Canned vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1670 (SD NR) | Grams purchased | Comparator: Arm2<br>Exponentiated coefficients: 1.016 (95% CI: 0.980, 1.052), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition          | Tool | N                                | Followup Outcome  | Outcome Unit    | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|-----------------------------|------|----------------------------------|---|-----------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Frozen vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 340 (SD NR) | Grams purchased | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Frozen vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 453 (SD NR) | Grams purchased | Comparator: Arm2<br>Exponentiated coefficients: 1.278 (95% CI: 1.198, 1.363), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |



| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition       | Tool | N                                | Followup Outcome   | Outcome Unit    | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|--------------------------|------|----------------------------------|--|-----------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | All vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 4302 (SD NR) | Grams purchased | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | All vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4670 (SD NR) | Grams purchased | Comparator: Arm2<br>Exponentiated coefficients: 1.087 (95% CI: 1.050, 1.128), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition                            | Tool | N                                | Followup Outcome   | Outcome Unit    | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|---|------|----------------------------------|--|-----------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Fresh vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 2123 (SD NR) | Grams purchased | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Fresh vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 2151 (SD NR) | Grams purchased | Comparator: Arm1<br>Exponentiated coefficients: 1.01 (95% CI: 0.969, 1.054), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition                             | Tool | N                                | Followup Outcome   | Outcome Unit    | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|--|------|----------------------------------|--|-----------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Canned vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1613 (SD NR) | Grams purchased | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Canned vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1415 (SD NR) | Grams purchased | Comparator: Arm2<br>Exponentiated coefficients: 0.872 (95% CI: 0.842, 0.904), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition                             | Tool | N                                | Followup Outcome  | Outcome Unit    | Between-group Difference   | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|--|------|----------------------------------|---|-----------------|--|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Frozen vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 340 (SD NR) | Grams purchased | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Frozen vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 311 (SD NR) | Grams purchased | Comparator: Arm2<br>Exponentiated coefficients: 0.904 (95% CI: 0.847, 0.965), p≤0.01 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition                          | Tool | N                                | Followup Outcome   | Outcome Unit    | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|---|------|----------------------------------|--|-----------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | All vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 4302 (SD NR) | Grams purchased | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | All vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3962 (SD NR) | Grams purchased | Comparator: Arm2<br>Exponentiated coefficients: 0.923 (95% CI: 0.892, 0.956), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition         | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|----------------------------|------|----------------------------------|--|------------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Fresh vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 7.8 (SD NR)  | Expenditures, \$ | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Fresh vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 8.94 (SD NR) | Expenditures, \$ | Comparator: Arm1<br>Exponentiated coefficients: 1.147 (95% CI: 1.116, 1.179), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition          | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|-----------------------------|------|----------------------------------|--|------------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Canned vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 4.03 (SD NR) | Expenditures, \$ | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Canned vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 4.32 (SD NR) | Expenditures, \$ | Comparator: Arm2<br>Exponentiated coefficients: 1.074 (95% CI: 1.041, 1.108), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition          | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|-----------------------------|------|----------------------------------|--|------------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Frozen vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1.02 (SD NR) | Expenditures, \$ | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Frozen vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1.33 (SD NR) | Expenditures, \$ | Comparator: Arm2<br>Exponentiated coefficients: 1.309 (95% CI: 1.232, 1.391), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |



| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition       | Tool | N                                | Followup Outcome  | Outcome Unit     | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|--------------------------|------|----------------------------------|---|------------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | All vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 13.53 (SD NR) | Expenditures, \$ | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | All vegetables purchased | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 14.98 (SD NR) | Expenditures, \$ | Comparator: Arm2<br>Exponentiated coefficients: 1.107 (95% CI: 1.075, 1.141), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition                            | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference   | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|---|------|----------------------------------|--|------------------|--|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Fresh vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 7.76 (SD NR) | Expenditures, \$ | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Fresh vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 7.95 (SD NR) | Expenditures, \$ | Comparator: Arm1<br>Exponentiated coefficients: 1.025 (95% CI: 0.998, 1.054), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition                             | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|--|------|----------------------------------|--|------------------|---|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Canned vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 3.99 (SD NR) | Expenditures, \$ | Comparator: Ref   | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Canned vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 3.76 (SD NR) | Expenditures, \$ | Comparator: Arm2<br>Exponentiated coefficients: 0.944 (95% CI: 0.915, 0.974), p≤0.001 | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition                             | Tool | N                                | Followup Outcome   | Outcome Unit     | Between-group Difference   | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|--|------|----------------------------------|--|------------------|--|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | Frozen vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 1.02 (SD NR) | Expenditures, \$ | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | Frozen vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 1 (SD NR)    | Expenditures, \$ | Comparator: Arm2<br>Exponentiated coefficients: 0.976 (95% CI: 0.916, 1.038), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

| Author, Year                   | Subgroup | Arm   | Arm Name                | Outcome Definition                          | Tool | N                                | Followup Outcome  | Outcome Unit     | Between-group Difference   | Adjusted Factors   |
|--------------------------------|----------|-------|-------------------------|---|------|----------------------------------|---|------------------|--|--|
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 1 | Pre-WIC, WIC household  | All vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2009<br>Outcome: Baseline: NR<br>Followup: Mean 13.49 (SD NR) | Expenditures, \$ | Comparator: Ref  | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |
| Andreyeva , 2015 <sup>56</sup> | NR       | Arm 2 | Post-WIC, WIC household | All vegetables purchased with non-WIC funds | NR   | Baseline: 2137<br>Followup: 2137 | Followup timepoint: 2010<br>Outcome: Baseline: NR<br>Followup: Mean 13.14 (SD NR) | Expenditures, \$ | Comparator: Arm2<br>Exponentiated coefficients: 0.974 (95% CI: 0.945, 1.003), p=NS | Adjusted with model accounting for WIC period, SNAP, receipt of cash assistance, grocery expenditure, number of transactions, average price of fruit/vegetable category, state |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-139. Characteristics and outcomes of studies using qualitative methods to explore perceptions about diet quality, intake of specific food groups, household food purchasing and benefit redemption**

| Author, Year,<br><br>Outcome  | Study Participants  | Data<br>Collection<br>Methods<br><br>Study Period | Study<br>Location         | Study Objective  | Brief Summary Of Findings  |
|---|---|---|---------------------------|--|--|
| Hromi-Fiedler ,<br>2016 <sup>80</sup><br><br>Fruit and<br>Vegetable Intake<br>(KQ1)               | ≥ 18 years old; in<br>2nd or 3rd trimester<br><br>Latina, WIC eligible,<br>preconception<br>overweight/obese,<br><br>N=45 | In-depth<br>interviews                            | Hartford,<br>Connecticut. | Identify barriers and<br>facilitators to improve<br>prenatal fruit and<br>vegetable (F&V)<br><br>intake among WIC<br>eligible Latinas                    | Ten variables affected prenatal F&V intake:<br><br>Social support was identified as the strongest factor<br>affecting fruit and vegetable intake. Other factors included<br>family structure, F&V access, F&V preferences, F&V<br>awareness, perceptions of F&V health outcomes, self-<br>efficacy, intentions, strategies for F&V action/coping<br>preparation, and status of maternal health.<br><br>WIC helped to reinforce knowledge about the benefits of<br>fruits and vegetables, and most importantly provided<br>monetary assistance so that women could purchased<br>fruits and vegetables.  |
| Anderson ,<br>2015 <sup>81</sup><br><br>Healthy Eating<br>and Gestational<br>Weight Gain<br>(KQ1) | Pregnant or 6 weeks<br>to 1 year postpartum<br>women<br><br>N= 29   | Focus groups                                      | Madison,<br>Wisconsin     | Explore barriers and<br>facilitators to healthy<br>eating and<br>gestational weight<br>gain among low<br>income women who<br>are overweight or<br>obese. | Knowledge/skills and cravings were the most frequent<br>obstacles at the intrapersonal level. Family, friends, and<br>social/cultural ideas around needing to substantially<br>increase food intake while pregnant, were the most<br>powerful driver on the interpersonal level. The WIC<br>program and clinics were an influential educational<br>resource on an organizational level. Lack of transportation<br>was very frequently discussed as a community level<br>barrier to health food access. Complex legislation and<br>social stigma surrounding the WIC program were also<br>cited as hurdles at the policy and societal level<br>respectively . |

| Author, Year,<br><br>Outcome  | Study Participants   | Data<br>Collection<br>Methods<br><br>Study Period            | Study<br>Location | Study Objective   | Brief Summary Of Findings  |
|---|--|--|-------------------|---|--|
| Kim, 2016 <sup>82</sup><br><br>Healthy eating<br>and gestational<br>weight<br>gain(KQ1) | WIC Participants<br>around LA area,<br>pregnant at time of<br>study, self-identified<br>as white/Caucasian,<br>Black/African-<br>American or<br>Hispanic/Latina.<br><br>N=59 | Focus groups<br><br>February-<br>December<br>2013            | California        | To explore<br>knowledge, attitude,<br>and perceptions<br>regarding weight<br>gain during<br>pregnancy among<br>participants in the<br>WIC program | Participants reported receiving social pressure to "eat for two", and were concerned about gaining too much weight but had minimal knowledge of weight gain goals during pregnancy. Some reported receiving regular weight monitoring, but inconsistent discussion on weight gain with healthcare providers. Most were not aware of IOM guidelines on gestational weight gain. |
| Robson , 2020 <sup>83</sup><br><br>Purchasing<br>practices (KQ2)                        | Parents with a<br>preschool-aged child<br><br>N=28   | Semi-<br>structured<br>interviews<br><br>Jan to June<br>2017 | Delaware          | To identify what<br>factors, influence<br>food purchasing<br>decisions of low-<br>income parents while<br>food shopping.                          | The purchase decision of parents was based on child preference, value, need for an item, or parent's preference for a product.<br><br>WIC influenced shopping behavior as participants seek WIC- eligible items. The study also revealed a frequent focus on buying bottled water and juice.   |

| Author, Year,<br><br>Outcome                                    | Study Participants  | Data Collection Methods<br><br>Study Period                        | Study Location     | Study Objective   | Brief Summary Of Findings  |
|---|---|--|--------------------|---|--|
| Weber , 2019 <sup>84</sup><br><br>Purchasing practices (KQ2)    | Caregivers of children enrolled in WIC for at least 6 months.<br><br>N=31 | Semi-structured in-depth interviews<br><br>April 2015 to July 2016 | State of Illinois, | To understand factors that contribute to low-income caregivers' perceived value of the benefits they receive from WIC | The perceived value of WIC was affected by several factors across multiple levels including: the interpersonal level (level of social support), institutional level ( e.g. work schedule or work place restrictions around breastfeeding), WIC clinic level (e.g. value of WIC services, relationships with WIC staff, availability of appointments ), Vendor level (e.g. ease of identifying WIC items, cashiers who are knowledge and experienced with WIC ), system levels (e.g. social stigma from using WIC and restrictions on food choice). Other themes existed that overlapped many levels (e.g. sense of being trapped in current neighborhood; perceived need and value of infant formula). |
| Bertmann , 2014 <sup>85</sup><br><br>Purchasing Practices (KQ2) | Participants in WIC who were at least 18 years of age<br><br>N=41         | Focus groups<br><br>August - Nov, 2012                             | Arizona            | To better understand barriers and facilitators to use of Cash Value Voucher for fruit and vegetable intake            | Several perceived challenges were identified including negative encounters with grocery store staff, dealing with staff who lacked training on how to process WIC benefits, and changes in redemption rules in the store from week to week. Some participants also expressed feeling judged or embarrassed for having to use WIC benefits.<br><br>Experienced shoppers deal with obstacles and maximize Cash Value Vouchers value through strategic selection of times and places for shopping and using price matching, incentive points, and other ways to improve buying power.   |



| Author, Year,<br><br>Outcome                                   | Study Participants  | Data<br>Collection<br>Methods<br><br>Study Period                        | Study<br>Location                           | Study Objective   | Brief Summary Of Findings  |
|--|---|--|---|---|--|
| Beck , 2014 <sup>86</sup><br><br>Purchasing<br>Practices (KQ2) | Latino parents with a<br>child between the<br>ages of 6 - 36<br>months.<br><br>N=29 | Semi-<br>structured<br>interviews<br><br>May and<br>September of<br>2012 | San<br>Francisco<br>Bay Area,<br>California | To understand<br>parents' beliefs about<br>the health effects of<br>different beverages<br>as well as their<br>preferred and actual<br>sources of<br>information on this<br>topic | <p>Parents thought water and milk were healthy drinks and that Sugar sweetened beverages were unhealthy for children. There were mixed views on the healthiness of 100% fruit juice.</p> <p>WIC is a major source of information and education around the health effects of beverages.</p> <p>However, WIC was also noted as a source of confusion. Some participants discussed that WIC discourages giving children juice but then gives parents access to free juice or puts 100% fruit juice on the list of approved beverages. This was regarded as a mixed messaging</p> <p>Some participants expressed a preference to receive education about beverages through WIC group classes.</p> <p>The most significant barrier to following drink guidelines was different practices among family members regarding which beverages they provide to children.</p> |

| Author, Year,<br><br>Outcome                                | Study Participants   | Data Collection Methods<br><br>Study Period         | Study Location             | Study Objective   | Brief Summary Of Findings  |
|---|--|---|----------------------------|---|--|
| Gleason, 2011 <sup>87</sup><br><br>Diet (KQ2)               | 126,850-116,956 WIC Participants   | multi-method, (cross-sectional design, focus group) | Wisconsin WIC Participants | <input type="checkbox"/> Examine the acceptance of the new WIC food package as measured by redemption rates and reported by WIC Participants through focus group discussions, and<br><br><input type="checkbox"/> Describe the food choices made by WIC Participants in the pre- and postimplementation environments. | Gleason and Pooler (2011) reported the results of a USDA-funded study of WIC participant redemption patterns among Wisconsin WIC Participants, one month prior to and then 6, 12 and 18 months after major food packages changes were implemented in 2009. Findings from this study provide insights regarding the impact of the WIC food package changes on benefit redemption as a measure of acceptance among approximately 126,850-116,956 WIC Participants who were largely non-Hispanic White (45.85), Hispanic (25.25), and non-Hispanic Black (17.5%).                       |
| Isaacs, 2020 <sup>88</sup><br><br>Breastfeeding (KQ1 & KQ2) | Adults enrolled or has child enrolled in WIC and primary person who redeems WIC benefits<br><br>N=15 | Focus groups<br><br>NR                              | North Carolina             | To gain a better understanding of maternal barriers and perceptions related to WIC participation in rural Appalachia  | <p>According to participants, most "valued" aspect were the financial benefits (offsetting costs of groceries) and support/resources (ex. Breastfeeding support and buying a breast pump) provided by WIC staff. Lack of variety in WIC approved foods and social stigma were major barriers.</p> <p>Negative experiences were discrepancies in nutrition recommendations and high-pressure approach by staff to nutrition education. Suggestions to improvement were improving available food packages, enhanced nutrition education services, and expanded community outreach.</p> |

| Author, Year,<br><br>Outcome                                     | Study Participants                                 | Data Collection Methods<br><br>Study Period                                     | Study Location                 | Study Objective  | Brief Summary Of Findings  |
|--|--|---|--------------------------------|--|--|
| Almeida , 2020 <sup>89</sup><br><br>Breastfeeding<br>(KQ1 & KQ2) | Mothers of 6- to 12-month-old infants<br><br>N= 31 | Structured focus groups<br><br>1 focus group session only (not extended period) | Los Angeles County, California | <p>-To better understand disparities in WIC program attrition among FF vs BF mothers</p> <p>-To determine the ways in which WIC supports both Breast Feeding (BF) and Formula Feeding ( FF) mothers;</p> <p>-To identify mothers' beliefs on being an FF mother in WIC , how those perceptions might affect ongoing program participation.</p> | <p>Mothers in the WIC program, determined several important benefits of WIC, including: BF support, nutrition education tailored to their needs, financial help by providing formula and foods.</p> <p>One of the important aspects of the WIC program is strong BF promotion and support. For example: early and frequent analysis of BF mothers' struggles and needs by staff, in-person and remote BF education, peer counselors and BF clinics.</p> <p>Themes that emerged included: feeling judged by WIC staff for not breast feeding, there were perceived difficulties obtaining desired amount of formula and desire for WIC to support the mothers personal choices, WIC viewed as primarily a formula provider by some FF mothers and other benefits of WIC were not as valuable to them; some mothers did felt there was no difference in the way FF and BF mothers were treated, only that WIC is focused on motivating mothers to breast feed.</p> |

| Author, Year,<br><br>Outcome   | Study Participants  | Data Collection Methods<br><br>Study Period | Study Location | Study Objective  | Brief Summary Of Findings   |
|--|---|---|----------------|--|---|
| Schindler-Ruwisch , 2019 <sup>90</sup><br><br>Breastfeeding<br><br>(KQ1 & KQ2) | <b>African American women</b> , primary caretaker of a young infant<br><br>N=24 | Semi-structured interviews                  | Washington DC  | -To further understand the factors, impact breastfeeding initiation and duration among African American WIC recipients in low-income areas | <p>There are multilevel barriers to breast feeding that are described: self-efficacy, confidence, physical obstacles related to breastfeeding, mismatched expectations around breastfeeding, external perceptions related to breastfeeding and availability of social support. Social support emerged as a them that consistently influenced breastfeeding intention and confidence.</p> <p>Some women report breastfeeding support in the hospital but then had a hard time accessing support after delivery.</p> <p>Although many women acknowledged that WIC offered breastfeeding support, few took advantage of these resources and some were unaware of these options or the extent of services WIC had to offer.</p> <p>There was an overall desire for more support from WIC. Those who did have access to support via a peer counselor or lactation consultant provided by WIC had positive experiences.</p> |

| Author, Year,<br><br>Outcome                                   | Study Participants                                     | Data<br>Collection<br>Methods<br><br>Study Period                        | Study<br>Location               | Study Objective  | Brief Summary Of Findings   |
|--|--|--|---------------------------------|--|---|
| Scott , 2016 <sup>91</sup><br><br>Breastfeeding<br>(KQ1 & KQ2) | Women, self-<br>reported as<br>Marshallese<br><br>N=31 | Brief survey<br>and focus<br>groups<br><br>21 January -<br>22 April 2015 | Arkansas                        | To identify beliefs<br>and experiences<br>impacting breast-<br>feeding in<br>Marshallese mothers   | Large proportion of mothers viewed breast milk as better<br>than formula, but were concerned about adequate milk<br>supply and nutritional value of breast milk. The main<br>barriers to exclusive breast-feeding in US: public shaming,<br>perceived milk production and quality, and maternal<br>employment. These barriers are encountered only after<br>moving to the US and not reported in the Marshall Island.   |
| Gross , 2015 <sup>92</sup><br><br>Breastfeeding<br>(KQ1 & KQ2) | current female WIC<br>peer counselors<br><br>N=23      | Focus groups<br><br>June to July<br>2013                                 | Georgia                         | Explore<br>breastfeeding<br>experiences of low-<br>income African<br>American women<br>through evaluation of<br>WIC peer counselors<br>that serve this<br>population | WIC peer counselors reported that reluctance to breast<br>feed among low income African American women may be<br>driven by several factors: Knowledge, confidence, body<br>image<br><br>Interpersonal relationship with family members, lack of<br>social support, and historical perceptions (e.g. enslaved<br>women as wet nurses), and cultural perceptions around<br>black womanhood (e.g. strong black woman complex and<br>challenges asking for support or help)   |
| Hohl , 2016 <sup>93</sup><br><br>Breastfeeding<br>(KQ1 & KQ2)  | Hispanic women<br><br>N=20                             | Semi-<br>structured<br>interviews<br><br>Between Sept-<br>Oct 2013       | Washington<br>state (not<br>DC) | To explore beliefs,<br>experiences, and<br>attitudes among<br>Hispanic women<br>living in rural<br>Washington State<br>towards<br>breastfeeding.                     | Participants said breastfeeding is rooted in their Hispanic<br>cultural heritage, and women's family members'<br>preferences for infant feeding were particularly important<br>in women's own breastfeeding decisions. Women said<br>that in the United States they were ashamed about<br>breastfeeding and, therefore, frequently preferred to<br>initiate formula feeding as a complement to escape<br>feelings of shame. Women claimed to also experience<br>economic pressure to work, and that the type of job also<br>influenced the decision to breast feed. |

| Author, Year,<br><br>Outcome                                  | Study Participants  | Data Collection Methods<br><br>Study Period   | Study Location         | Study Objective   | Brief Summary Of Findings   |
|---|---|---|------------------------|---|---|
| Bedwell , 2017 <sup>94</sup><br><br>Breastfeeding (KQ1 & KQ2) | Women<br><br>N=25   | Questionnaires and semi-structured interviews | Monroe County, Indiana | To explore the influence of changes to the WIC food package ( via interim rule) on infant feeding practices.      | For most participants the incentives for the exclusive breastfeeding packages were helpful, but not the main driver for the decision to breast feed. Participants cited the health of the baby or challenges with breast feeding as being influential in their decision to breast feed.   |
| Gross, 2017<br><br>Breastfeeding (KQ1 & KQ2)                  | African American currently or previously enrolled in WIC who currently or previously breasted one of their children for at least 6 months<br><br>N=11 | July-September 2013                           | Georgia                | To explore breastfeeding experiences of low-income African American who successful breasted to 6 months or longer | Four themes emerged: <b>1) Deciding to breast feed, 2) Initiating breast feeding 3) Breastfeeding long term, and 4) Expanding breast feeding support</b><br><br>Participants offered suggestions to improve breast feeding support for other African American women: including increasing racial and gender concordance of lactation personnel and breastfeeding support groups, enhancing media representation of African American breast-feeding mothers, and increasing prenatal discussions around breastfeeding. |

| Author, Year,<br><br>Outcome                                 | Study Participants   | Data<br>Collection<br>Methods<br><br>Study Period | Study<br>Location | Study Objective  | Brief Summary Of Findings  |
|--|--|---|-------------------|--|--|
| Ruiz, 2011 <sup>95</sup><br><br>Breastfeeding<br>(KQ1 & KQ2) | Nutritionists/dietitians<br>who worked for at<br>least one year in the<br>WIC program who<br>speak Spanish<br><br>N=29 | Focus groups<br><br>NR                            | Puerto Rico       | To better understand<br>Nutritionist-Dietician<br>opinions concerning<br>WIC Program<br>strategies to promote<br>breastfeeding in<br>Puerto Rico | Barriers to breastfeeding initiation and continuation<br>among Puerto Rican mothers included hospital barriers,<br>such as physicians lack of endorsement of breastfeeding<br>and/or contradicting messages between physicians and<br>dietician-nutritionist, inadequate family support, concerns<br>about returning to work, and baby's getting adequate<br>nutrition from breastfeeding, and overall lack of<br>knowledge around breast feeding.<br><br>Effective strategies to promote breastfeeding included<br>individual counseling, group classes, use of WIC<br>educational pamphlets, WIC peer counselors, displaying<br>positive images of breastfeeding mothers, and follow up<br>check in phone calls through pregnancy and postpartum |

BF=breastfeeding; CA=California; DC=District of Columbia; F&V=fruits and vegetables; FF=formula feeding; KQ=Key Question; N=sample size; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-140. Fetal and neonatal mortality categorical outcomes of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group         | Arm   | Arm Name          | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                | Between-group Difference                                | Adjusted Factors   |
|----------------------------|-------------------|-------|-------------------|---|---------------|---------------------------------------|---|--|
| Anglely, 2018 <sup>1</sup> | No WIC enrollment | Arm 2 | White stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Anglely, 2018 <sup>1</sup> | No WIC enrollment | Arm 4 | Black stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 0.67 (95% CI: 0.30, 1.51), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |



| Author, Year              | Sub-group         | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                               | Adjusted Factors   |
|---------------------------|-------------------|-------|----------------------|---|---------------|---|--|--|
| Angley, 2018 <sup>1</sup> | No WIC enrollment | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR       | Comparator: Arm2<br>OR: 0.9 (95% CI: 0.46, 1.77), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | NR                | Arm 1 | White live births    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 580           | Followup timepoint: NR<br>Outcome: 580 (NR) | Comparator: Ref  | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group | Arm   | Arm Name          | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                | Adjusted Factors   |
|---------------------------|-----------|-------|-------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | NR        | Arm 2 | White stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 185           | Followup timepoint: NR<br>Outcome: 185 (NR) | Comparator: Arm1<br>OR: 1.69 (95% CI: 0.89, 3.20), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | NR        | Arm 3 | Black live births | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 147           | Followup timepoint: NR<br>Outcome: 147 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                | Adjusted Factors   |
|---------------------------|-----------|-------|----------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | NR        | Arm 4 | Black stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 123           | Followup timepoint: NR<br>Outcome: 123 (NR) | Comparator: Arm3<br>OR: 0.34 (95% CI: 0.16, 0.72), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | NR        | Arm 5 | Hispanic live births | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 458           | Followup timepoint: NR<br>Outcome: 458 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group  | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                | Adjusted Factors   |
|---------------------------|--|-------|----------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | NR   | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 204           | Followup timepoint: NR<br>Outcome: 204 (NR) | Comparator: Arm5<br>OR: 0.91 (95% CI: 0.54, 1.52), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 1 | White live births    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 199           | Followup timepoint: NR<br>Outcome: 161 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group  | Arm   | Arm Name          | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                               | Adjusted Factors   |
|---------------------------|--|-------|-------------------|---|---------------|---|--|--|
| Angley, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 2 | White stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 65            | Followup timepoint: NR<br>Outcome: 52 (NR)  | Comparator: Arm1<br>OR: 1 (95% CI: 0.33 to 3.02), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 3 | Black live births | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 47            | Followup timepoint: NR<br>Outcome: 102 (NR) | Comparator: Ref  | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group  | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|---------------------------|--|-------|----------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 4 | Black stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 36            | Followup timepoint: NR<br>Outcome: 77 (NR)  | Comparator: Arm3<br>OR: 0.86 (95% CI: 0.22 to 3.33), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 5 | Hispanic live births | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 115           | Followup timepoint: NR<br>Outcome: 286 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year             | Sub-group   | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|--------------------------|---|-------|----------------------|---|---------------|---|---|--|
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses                    | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 79            | Followup timepoint: NR<br>Outcome: 133 (NR) | Comparator: Arm5<br>OR: 0.96 (95% CI: 0.34 to 2.67), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses, No WIC enrollment | Arm 2 | White stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR       | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year             | Sub-group   | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                | Between-group Difference                                | Adjusted Factors   |
|--------------------------|---|-------|----------------------|---|---------------|---------------------------------------|---|--|
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses, No WIC enrollment | Arm 4 | Black stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 1.23 (95% CI: 0.34, 4.50), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses, No WIC enrollment | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 2.11 (95% CI: 0.57, 7.74), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |



| Author, Year              | Sub-group  | Arm   | Arm Name          | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                | Between-group Difference                                | Adjusted Factors   |
|---------------------------|--|-------|-------------------|---|---------------|---------------------------------------|---|--|
| Angley, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses, WIC enrollment | Arm 2 | White stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses, WIC enrollment | Arm 4 | Black stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 1.43 (95% CI: 0.42, 4.91), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group  | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                               | Adjusted Factors   |
|---------------------------|--|-------|----------------------|---|---------------|---|--|--|
| Angley, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses, WIC enrollment | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR       | Comparator: Arm2<br>OR: 2.2 (95% CI: 0.90, 5.39), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured   | Arm 1 | White live births    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 161           | Followup timepoint: NR<br>Outcome: 161 (NR) | Comparator: Ref  | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group                | Arm   | Arm Name          | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                 | Adjusted Factors   |
|---------------------------|--------------------------|-------|-------------------|---|---------------|---|--|--|
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 2 | White stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 52            | Followup timepoint: NR<br>Outcome: 52 (NR)  | Comparator: Arm1<br>OR: 2.2 (95% CI: 0.87 to 5.61), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 3 | Black live births | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 102           | Followup timepoint: NR<br>Outcome: 102 (NR) | Comparator: Ref  | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group                | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|---------------------------|--------------------------|-------|----------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 4 | Black stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 77            | Followup timepoint: NR<br>Outcome: 77 (NR)  | Comparator: Arm3<br>OR: 0.21 (95% CI: 0.08 to 0.54), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 5 | Hispanic live births | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 286           | Followup timepoint: NR<br>Outcome: 286 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group                                   | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|---------------------------|---|-------|----------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured                    | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | 133           | Followup timepoint: NR<br>Outcome: 133 (NR) | Comparator: Arm5<br>OR: 1.62 (95% CI: 0.86 to 3.04), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured, No WIC enrollment | Arm 2 | White stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR       | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group                                   | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                | Between-group Difference                                | Adjusted Factors   |
|---------------------------|---|-------|----------------------|---|---------------|---------------------------------------|---|--|
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured, No WIC enrollment | Arm 4 | Black stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 0.46 (95% CI: 0.17, 1.27), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured, No WIC enrollment | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 0.82 (95% CI: 0.38, 1.80), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group                                | Arm   | Arm Name          | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                | Between-group Difference                                 | Adjusted Factors   |
|---------------------------|--|-------|-------------------|---|---------------|---------------------------------------|--|--|
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured, WIC enrollment | Arm 2 | White stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref  | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured, WIC enrollment | Arm 4 | Black stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 4.78 (95% CI: 1.67, 13.69), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group                                | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                | Between-group Difference                                | Adjusted Factors   |
|---------------------------|--|-------|----------------------|---|---------------|---------------------------------------|---|--|
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured, WIC enrollment | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 1.12 (95% CI: 0.44, 2.82), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | WIC enrollment                           | Arm 2 | White stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |



| Author, Year              | Sub-group      | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                | Between-group Difference                                | Adjusted Factors   |
|---------------------------|----------------|-------|----------------------|---|---------------|---------------------------------------|---|--|
| Angley, 2018 <sup>1</sup> | WIC enrollment | Arm 4 | Black stillbirths    | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 3.38 (95% CI: 1.70, 6.71), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | WIC enrollment | Arm 6 | Hispanic stillbirths | Association between WIC participation and stillbirth with interaction terms for WIC x maternal race | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm2<br>OR: 1.68 (95% CI: 0.99, 2.85), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group | Arm   | Arm Name          | Outcome Definition                                | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | NR        | Arm 1 | White live births | Association of WIC enrollment on stillborn status | 580           | Followup timepoint: NR<br>Outcome: 580 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | NR        | Arm 2 | White stillbirths | Association of WIC enrollment on stillborn status | 185           | Followup timepoint: NR<br>Outcome: 185 (NR) | Comparator: Arm1<br>OR: 1.49 (95% CI: 0.66 to 3.35), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group | Arm   | Arm Name          | Outcome Definition                                | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | NR        | Arm 3 | Black live births | Association of WIC enrollment on stillborn status | 147           | Followup timepoint: NR<br>Outcome: 147 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | NR        | Arm 4 | Black stillbirths | Association of WIC enrollment on stillborn status | 123           | Followup timepoint: NR<br>Outcome: 123 (NR) | Comparator: Arm3<br>OR: 0.31 (95% CI: 0.14 to 0.68), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group | Arm   | Arm Name             | Outcome Definition                                | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|---------------------------|-----------|-------|----------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | NR        | Arm 5 | Hispanic live births | Association of WIC enrollment on stillborn status | 458           | Followup timepoint: NR<br>Outcome: 458 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | NR        | Arm 6 | Hispanic stillbirths | Association of WIC enrollment on stillborn status | 204           | Followup timepoint: NR<br>Outcome: 204 (NR) | Comparator: Arm5<br>OR: 1.14 (95% CI: 0.67 to 4.37), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year             | Sub-group  | Arm   | Arm Name          | Outcome Definition                                | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|--------------------------|--|-------|-------------------|---|---------------|---|---|--|
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 1 | White live births | Association of WIC enrollment on stillborn status | 199           | Followup timepoint: NR<br>Outcome: 161 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 2 | White stillbirths | Association of WIC enrollment on stillborn status | 65            | Followup timepoint: NR<br>Outcome: 52 (NR)  | Comparator: Arm1<br>OR: 0.22 (95% CI: 0.06 to 0.85), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year             | Sub-group  | Arm   | Arm Name          | Outcome Definition                                | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                 | Adjusted Factors   |
|--------------------------|--|-------|-------------------|---|---------------|---|--|--|
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 3 | Black live births | Association of WIC enrollment on stillborn status | 47            | Followup timepoint: NR<br>Outcome: 102 (NR) | Comparator: Ref  | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 4 | Black stillbirths | Association of WIC enrollment on stillborn status | 36            | Followup timepoint: NR<br>Outcome: 77 (NR)  | Comparator: Arm3<br>OR: 0.8 (95% CI: 0.14 to 4.47), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year             | Sub-group  | Arm   | Arm Name             | Outcome Definition                                | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|--------------------------|--|-------|----------------------|---|---------------|---|---|--|
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 5 | Hispanic live births | Association of WIC enrollment on stillborn status | 115           | Followup timepoint: NR<br>Outcome: 286 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angle, 2018 <sup>1</sup> | Nulliparous women who had experienced no previous pregnancy losses | Arm 6 | Hispanic stillbirths | Association of WIC enrollment on stillborn status | 79            | Followup timepoint: NR<br>Outcome: 133 (NR) | Comparator: Arm5<br>OR: 0.99 (95% CI: 0.33 to 2.92), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year              | Sub-group                | Arm   | Arm Name          | Outcome Definition                                | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|---------------------------|--------------------------|-------|-------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 1 | White live births | Association of WIC enrollment on stillborn status | 161           | Followup timepoint: NR<br>Outcome: 161 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 2 | White stillbirths | Association of WIC enrollment on stillborn status | 52            | Followup timepoint: NR<br>Outcome: 52 (NR)  | Comparator: Arm1<br>OR: 2.11 (95% CI: 0.75 to 5.95), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |



| Author, Year              | Sub-group                | Arm   | Arm Name          | Outcome Definition                                | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|---------------------------|--------------------------|-------|-------------------|---|---------------|---|---|--|
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 3 | Black live births | Association of WIC enrollment on stillborn status | 102           | Followup timepoint: NR<br>Outcome: 102 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Angley, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 4 | Black stillbirths | Association of WIC enrollment on stillborn status | 77            | Followup timepoint: NR<br>Outcome: 77 (NR)  | Comparator: Arm3<br>OR: 0.23 (95% CI: 0.09 to 0.59), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |

| Author, Year               | Sub-group                | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                      | Between-group Difference                                  | Adjusted Factors   |
|----------------------------|--------------------------|-------|----------------------|---|---------------|---|---|--|
| Anglely, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 5 | Hispanic live births | Association of WIC enrollment on stillborn status                                 | 286           | Followup timepoint: NR<br>Outcome: 286 (NR) | Comparator: Ref   | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Anglely, 2018 <sup>1</sup> | On Medicaid or uninsured | Arm 6 | Hispanic stillbirths | Association of WIC enrollment on stillborn status                                 | 133           | Followup timepoint: NR<br>Outcome: 133 (NR) | Comparator: Arm5<br>OR: 2.16 (95% CI: 1.06 to 4.37), p=NR | Maternal age, insurance status, gestational age at delivery and pregnancy history, preexisting diabetes, hypertension and pre-pregnancy obesity, trimester of entry into prenatal care and chart-documented hospitalizations during pregnancy, marital status, receipt of wages (by any household member) and education, smoking status during pregnancy and lifetime illicit drug use (Model 5) |
| Anglely, 2018 <sup>1</sup> | NR                       | Arm 1 | White live births    | Association of WIC enrollment on stillborn status, controlled for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR       | Comparator: Ref   | Gestational age  |

| Author, Year               | Sub-group                                  | Arm   | Arm Name                        | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                                     | Between-group Difference                                  | Adjusted Factors  |
|----------------------------|--|-------|---------------------------------|---|---------------|--|---|---|
| Anglely, 2018 <sup>1</sup> | NR   | Arm 2 | White stillbirths               | Association of WIC enrollment on stillborn status, controlled for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR                      | Comparator: Arm1<br>OR: 2.21 (95% CI: 1.23 to 3.96), p=NR | Gestational age   |
| Anglely, 2018 <sup>1</sup> | NR   | Arm 3 | Black live births               | Association of WIC enrollment on stillborn status, controlled for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR                      | Comparator: Ref   | Gestational age   |
| Anglely, 2018 <sup>1</sup> | NR   | Arm 4 | Black stillbirths               | Association of WIC enrollment on stillborn status, controlled for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR                      | Comparator: Arm3<br>OR: 0.58 (95% CI: 0.29 to 1.16), p=NR | Gestational age   |
| Anglely, 2018 <sup>1</sup> | NR   | Arm 5 | Hispanic live births            | Association of WIC enrollment on stillborn status, controlled for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR                      | Comparator: Ref   | Gestational age   |
| Anglely, 2018 <sup>1</sup> | NR   | Arm 6 | Hispanic stillbirths            | Association of WIC enrollment on stillborn status, controlled for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR                      | Comparator: Arm5<br>OR: 0.94 (95% CI: 0.59 to 1.50), p=NR | Gestational age   |
| Fingar, 2017 <sup>6</sup>  | NR   | Arm 1 | Did not redeem during pregnancy | fetal death   | 18604         | Followup timepoint: NR<br>Outcome: 264 (1.41904966673834)  | Comparator: NR  | Gestational age at birth, Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup>  | WIC enrollment 1st trimester (<14 weeks)   | Arm 2 | Redeemed during pregnancy       | fetal death   | 112756        | Followup timepoint: NR<br>Outcome: 408 (0.361843272198375) | Comparator: NR  | Gestational age at birth, Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup>  | WIC enrollment 2nd trimester (14-27 weeks) | Arm 2 | Redeemed during pregnancy       | fetal death   | 68648         | Followup timepoint: NR<br>Outcome: 285 (0.415161403099872) | Comparator: NR  | Gestational age at birth, Maternal socio-demographic and health characteristics |

| Author, Year                    | Sub-group  | Arm   | Arm Name                        | Outcome Definition   | N at Analysis | Followup Outcome, n(%)  | Between-group Difference                                  | Adjusted Factors   |
|---------------------------------|--|-------|---------------------------------|--|---------------|---|---|--|
| Fingar, 2017 <sup>6</sup>       | WIC enrollment 3rd trimester (27 weeks-birth)                          | Arm 2 | Redeemed during pregnancy       | fetal death  | 25991         | Followup timepoint: NR<br>Outcome: 59 (0.227001654418837)     | Comparator: NR  | Gestational age at birth, Maternal socio-demographic and health characteristics  |
| Fingar, 2017 <sup>6</sup>       | WIC enrollment Postpartum (birth-46 weeks after last menstrual period) | Arm 2 | Redeemed during pregnancy       | fetal death  | 10565         | Followup timepoint: NR<br>Outcome: 17 (0.16090866067203)      | Comparator: NR  | Gestational age at birth, Maternal socio-demographic and health characteristics  |
| EI-Bastawisi, 2007 <sup>5</sup> | No   | Arm 1 | Eligible WIC non-participants   | Fetal death (stillborn >20 weeks gestation)  | 10595         | Followup timepoint: At birth<br>Outcome: 105 (1)              | Comparator: Ref   | Age and the WIC effect varies by maternal education and is protective for all education except those > 15 years of education |
| EI-Bastawisi, 2007 <sup>5</sup> | No   | Arm 2 | WIC Participants                | Fetal death (stillborn >20 weeks gestation)  | 29013         | Followup timepoint: At birth<br>Outcome: 90 (0.3)             | Comparator: 2 vs. 1<br>p<0.001                            | Age and the WIC effect varies by maternal education and is protective for all education except those > 15 years of education |
| Fingar, 2017 <sup>6</sup>       | NR   | Arm 1 | Did not redeem during pregnancy | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths), Odds ratio           | 18340         | Followup timepoint: End of pregnancy<br>Outcome: 1045 (5.7)   | Comparator: Ref   | Gestational age at birth   |
| Fingar, 2017 <sup>6</sup>       | NR   | Arm 2 | Redeemed during pregnancy       | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths), Odds ratio           | 217191        | Followup timepoint: End of pregnancy<br>Outcome: 11963 (5.51) | Comparator: Arm1<br>OR: 0.31 (95% CI: 0.26 to 0.37), p=NR | Gestational age at birth   |
| Fingar, 2017 <sup>6</sup>       | NR   | Arm 1 | Did not redeem during pregnancy | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths), Cox model regression | 18340         | Followup timepoint: End of pregnancy<br>Outcome: 1045 (5.7)   | Comparator: Ref   | Maternal socio-demographic and health characteristics  |

| Author, Year              | Sub-group                                  | Arm   | Arm Name                        | Outcome Definition   | N at Analysis | Followup Outcome, n(%)   | Between-group Difference   | Adjusted Factors                                      |
|---------------------------|--|-------|---------------------------------|--|---------------|--|--|---|
| Fingar, 2017 <sup>6</sup> | NR   | Arm 2 | Redeemed during pregnancy       | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths), Cox model regression | 217191        | Followup timepoint: End of pregnancy<br>Outcome: 11963 (5.51)              | Comparator: Arm1<br>Cox proportional hazard: 0.89: NR (95% CI: 0.78 to 1.02), p=NR | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | NR   | Arm 1 | Did not redeem during pregnancy | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths)                       | NR            | Followup timepoint: week 29<br>Outcome: NR                                 | Comparator: Ref  | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | NR   | Arm 2 | Redeemed during pregnancy       | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths)                       | NR            | Followup timepoint: week 29<br>Outcome: NR                                 | Comparator: Arm1<br>Survival model HR: 0.78: NR (95% CI: 0.61 to 0.99), p=NR       | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | NR   | Arm 1 | Did not redeem during pregnancy | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths)                       | NR            | Followup timepoint: week 43<br>Outcome: NR                                 | Comparator: Ref  | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | NR   | Arm 2 | Redeemed during pregnancy       | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths)                       | NR            | Followup timepoint: week 43<br>Outcome: NR                                 | Comparator: Arm1<br>Survival model HR: 0.69: NR (95% CI: 0.48 to 0.99), p=NR       | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | NR   | Arm 1 | Did not redeem during pregnancy | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths)                       | 18604         | Followup timepoint: Week of death or 46 weeks<br>Outcome: 428 (Rate: 23.0) | Comparator: NR   | NR  |
| Fingar, 2017 <sup>6</sup> | WIC enrollment 1st trimester (<14 weeks)   | Arm 2 | Redeemed during pregnancy       | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths)                       | 112756        | Followup timepoint: Week of death or 46 weeks<br>Outcome: 864 (Rate: 7.7)  | Comparator: NR   | NR  |
| Fingar, 2017 <sup>6</sup> | WIC enrollment 2nd trimester (14-27 weeks) | Arm 2 | Redeemed during pregnancy       | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths)                       | 68648         | Followup timepoint: Week of death or 46 weeks<br>Outcome: 512 (Rate: 7.5)  | Comparator: NR   | NR  |

| Author, Year              | Sub-group  | Arm   | Arm Name                  | Outcome Definition   | N at Analysis | Followup Outcome, n(%)  | Between-group Difference | Adjusted Factors |
|---------------------------|--|-------|---------------------------|--|---------------|---|--------------------------|------------------|
| Fingar, 2017 <sup>6</sup> | WIC enrollment 3rd trimester (27 weeks-birth)                          | Arm 2 | Redeemed during pregnancy | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths) | 25991         | Followup timepoint: Week of death or 46 weeks<br>Outcome: 104 (Rate: 4.0) | Comparator: NR           | NR               |
| Fingar, 2017 <sup>6</sup> | WIC enrollment Postpartum (birth-46 weeks after last menstrual period) | Arm 2 | Redeemed during pregnancy | Perinatal deaths (Rate of PND per 1000 live births and fetal deaths) | 10565         | Followup timepoint: Week of death or 46 weeks<br>Outcome: 44 (Rate: 4.2)  | Comparator: NR           | NR               |

CI=confidence interval; HR=hazard ratio; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; PND=perinatal death; Ref=reference; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-141. Neonatal mortality continuous outcomes of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Subgroup | Arm   | Arm Name                        | Outcome Definition   | N                            | Followup Outcome   | Between-group Difference                                  | Adjusted Factors                                      |
|---------------------------|----------|-------|---------------------------------|--|------------------------------|--|---|---|
| Fingar, 2017 <sup>6</sup> | NR       | Arm 1 | Did not redeem during pregnancy | Perinatal deaths association with increased number of food packages (Hazard ratio) | Baseline: NR<br>Followup: NR | Followup timepoint: Week 27<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref   | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | NR       | Arm 2 | Redeemed during pregnancy       | Perinatal deaths association with increased number of food packages (Hazard ratio) | Baseline: NR<br>Followup: NR | Followup timepoint: Week 27<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm1<br>HR: 0.94 (95% CI: 0.90 to 0.99), p=NR | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | NR       | Arm 1 | Did not redeem during pregnancy | Perinatal deaths association with increased number of food packages (Hazard ratio) | Baseline: NR<br>Followup: NR | Followup timepoint: Week 46<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref   | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | NR       | Arm 2 | Redeemed during pregnancy       | Perinatal deaths association with increased number of food packages (Hazard ratio) | Baseline: NR<br>Followup: NR | Followup timepoint: Week 46<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm1<br>HR: 0.91 (95% CI: 0.85 to 0.97), p=NR | Maternal socio-demographic and health characteristics |

CI=confidence interval; HR=hazard ratio; n=sample size; NR=not reported; p=p-value; Ref=reference

**Evidence Table D-142. Infant gestational age categorical outcomes of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Subgroup | Arm   | Arm Name                        | Outcome Definition       | N at Analysis | Followup Outcome, n(%)                | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|---------------------------------|--------------------------|---------------|---------------------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 1 | Infant born before WIC revision | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 2 | Infant born after WIC revision  | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm 1<br>Change in percentage points: -0.0017 (95% CI: -0.8 to 0.8), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 1 | Infant born before WIC revision | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 2 | Infant born after WIC revision  | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm 1<br>Change in percentage points: 0.17 (95% CI: -1.1 to 1.5), p=NR    | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 1 | Infant born before WIC revision | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 2 | Infant born after WIC revision  | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm 1<br>Change in percentage points: -0.23 (95% CI: -0.67 to 0.21), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR       | Arm 1 | Infant born before WIC revision | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |



| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition       | N at Analysis | Followup Outcome, n(%)                | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|--------------------------|---------------|---------------------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm 1<br>Change in percentage points: 0.17 (95% CI: -0.075 to 0.42), p=NR | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm 1<br>Change in percentage points: 0.084 (95% CI: -1.2 to 1.4), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Born <37 weeks gestation | NR            | Followup timepoint: NR<br>Outcome: NR | Comparator: Arm 1<br>Change in percentage points: 0.77 (95% CI: 0.26 to 1.3), p=NR    | Mother's education, age, and parity and infant's sex and year of birth                 |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-143. Infant gestational age continuous outcomes of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup | Arm     | Arm Name    | Outcome Definition | N                               | Followup Outcome  | Within-group Difference                             | Between-group Difference | Adjusted Factors   |
|-----------------------------|----------|---------|-------------|--------------------|---------------------------------|---|---|--------------------------|--|
| Sonchak, 2016 <sup>13</sup> | Black    | Overall | Overall arm | Gestational age    | Baseline: 6713<br>Followup: NR  | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 0.346 (SE 0.036), p<0.01 | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year |
| Sonchak, 2016 <sup>13</sup> | No       | Overall | Overall arm | Gestational age    | Baseline: 12661<br>Followup: NR | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 0.271 (SE 0.024), p<0.01 | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year |
| Sonchak, 2016 <sup>13</sup> | White    | Overall | Overall arm | Gestational age    | Baseline: 5948<br>Followup: NR  | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 0.185 (SE 0.03), p<0.01  | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-144. Infant gestational age continuous outcomes of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Subgroup | Arm   | Arm Name                        | Outcome Definition             | N                            | Followup Outcome  | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|---------------------------------|--------------------------------|------------------------------|---|---|--|
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 1 | Infant born before WIC revision | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 2 | Infant born after WIC revision  | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm 1<br>Change in percentage points: 0.021 (95% CI: -0.030 to 0.071), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 1 | Infant born before WIC revision | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 2 | Infant born after WIC revision  | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm 1<br>Change in percentage points: -0.045 (95% CI: -0.14 to 0.052), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 1 | Infant born before WIC revision | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 2 | Infant born after WIC revision  | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm 1<br>Change in percentage points: 0.048 (95% CI: 0.019 to 0.78), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR       | Arm 1 | Infant born before WIC revision | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition             | N                            | Followup Outcome  | Between-group Difference   | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|--------------------------------|------------------------------|---|--|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm 1<br>Change in percentage points: 0.018 (95% CI: 0.001 to 0.034), p=NR     | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm 1<br>Change in percentage points: -0.026 (95% CI: -0.11 to 0.057), p=NR    | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Gestational age, not specified | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | Comparator: Arm 1<br>Change in percentage points: -0.036 (95% CI: -0.069 to -0.0020), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-145. Infant gestational age categorical outcomes (late preterm/term) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm     | Arm Name                                      | Outcome Definition             | N at Analysis | Followup Outcome, n(%)                            | Between-group Difference           | Adjusted Factors  |
|----------------------------|-----------|---------|---|--------------------------------|---------------|---|------------------------------------|---|
| Soneji, 2019 <sup>15</sup> | NA        | Arm 1   | Did not receive WIC benefits during pregnancy | Normal term ( $\geq 37$ weeks) | NR            | Followup timepoint: NA<br>Outcome: 2413521 (85.7) | Comparator: Ref                    | sociodemographic characteristics, clinical risk factors, receipt of prenatal care, maternal smoking |
| Soneji, 2019 <sup>15</sup> | NA        | Arm 2   | Received WIC benefits during pregnancy        | Normal term ( $\geq 37$ weeks) | NR            | Followup timepoint: NA<br>Outcome: 853076 (10.5)  | Comparator: 2 vs. 1<br>$p < 0.001$ | sociodemographic characteristics, clinical risk factors, receipt of prenatal care, maternal smoking |
| Soneji, 2019 <sup>15</sup> | NA        | Overall | All Medicaid-insured expectant mothers        | Normal term ( $\geq 37$ weeks) | NR            | Followup timepoint: NA<br>Outcome: 9698970 (87)   | Comparator: NA                     | sociodemographic characteristics, clinical risk factors, receipt of prenatal care, maternal smoking |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-146. Infant gestational age categorical outcomes (preterm) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                                      | Outcome Definition            | Tool | N at Analysis | Followup Outcome, n(%)                         | Within-group Difference | Between-group Difference       | Adjusted Factors  |
|----------------------------|----------|-------|---|-------------------------------|------|---------------|--|-------------------------|--------------------------------|---|
| Soneji, 2019 <sup>15</sup> | NA       | Arm 1 | Did not receive WIC benefits during pregnancy | Extremely preterm (<28 weeks) | NA   | NR            | Followup timepoint: NA<br>Outcome: 34800 (1.2) | Not reported            | Comparator: Ref                | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | NA       | Arm 2 | Received WIC benefits during pregnancy        | Extremely preterm (<28 weeks) | NA   | NR            | Followup timepoint: NA<br>Outcome: 56558 (0.7) | Not reported            | Comparator: 2 vs. 1<br>p<0.001 | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |

| Author, Year               | Subgroup | Arm     | Arm Name                                      | Outcome Definition                     | Tool | N at Analysis | Followup Outcome, n(%)                           | Within-group Difference | Between-group Difference       | Adjusted Factors  |
|----------------------------|----------|---------|---|--|------|---------------|--|-------------------------|--------------------------------|---|
| Soneji, 2019 <sup>15</sup> | NA       | Overall | All medicaid-insured expectant mothers        | Extremely preterm (<28 weeks)          | NA   | NR            | Followup timepoint: NA<br>Outcome: 94979 (0.9)   | Not reported            | Comparator: NA                 | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | NA       | Arm 1   | Did not receive WIC benefits during pregnancy | Moderate-to-late preterm (32-37 weeks) | NA   | NR            | Followup timepoint: NA<br>Outcome: 316155 (11.2) | Not reported            | Comparator: Ref                | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | NA       | Arm 2   | Received WIC benefits during pregnancy        | Moderate-to-late preterm (32-37 weeks) | NA   | NR            | Followup timepoint: NA<br>Outcome: 853076 (10.5) | Not reported            | Comparator: 2 vs. 1<br>p<0.001 | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |

| Author, Year               | Subgroup | Arm     | Arm Name                                      | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                     | Adjusted Factors  |
|----------------------------|----------|---------|---|---|------|---------------|---|-------------------------|--|---|
| Soneji, 2019 <sup>15</sup> | NA       | Overall | All medicaid-insured expectant mothers        | Moderate-to-late preterm (32-37 weeks)  | NA   | NR            | Followup timepoint: NA<br>Outcome: 1190100 (10.7) | Not reported            | Comparator: NA   | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Hispanic | Arm 1   | Did not receive WIC benefits during pregnancy | Ordinal variable for gestational age cat (moderate-to-late preterm, very preterm, extremely preterm, vs. normal term) | NA   | NR            | Followup timepoint: NA<br>Outcome: NR             | Not reported            | Comparator: Ref  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Hispanic | Arm 2   | Received WIC benefits during pregnancy        | Ordinal variable for gestational age cat (moderate-to-late preterm, very preterm, extremely preterm, vs. normal term) | NA   | NR            | Followup timepoint: NA<br>Outcome: NR             | Not reported            | Comparator: 2 vs. 1<br>OR: 0.91 (95% CI: 0.90 to 0.92), p=NR | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |



| Author, Year               | Subgroup           | Arm   | Arm Name                                      | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                                     | Adjusted Factors  |
|----------------------------|--------------------|-------|---|---|------|---------------|---------------------------------------|-------------------------|--|---|
| Soneji, 2019 <sup>15</sup> | Non-Hispanic Black | Arm 1 | Did not receive WIC benefits during pregnancy | Ordinal variable for gestational age cat (moderate-to-late preterm, very preterm, extremely preterm, vs. normal term) | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: Ref  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Non-Hispanic Black | Arm 2 | Received WIC benefits during pregnancy        | Ordinal variable for gestational age cat (moderate-to-late preterm, very preterm, extremely preterm, vs. normal term) | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.88 (95% CI: 0.87 to 0.89), p=NR | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Non-Hispanic white | Arm 1 | Did not receive WIC benefits during pregnancy | Ordinal variable for gestational age cat (moderate-to-late preterm, very preterm, extremely preterm, vs. normal term) | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: Ref  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |

| Author, Year               | Subgroup                 | Arm   | Arm Name                                      | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                                     | Adjusted Factors  |
|----------------------------|--------------------------|-------|---|---|------|---------------|---------------------------------------|-------------------------|--|---|
| Soneji, 2019 <sup>15</sup> | Non-Hispanic white       | Arm 2 | Received WIC benefits during pregnancy        | Ordinal variable for gestational age cat (moderate-to-late preterm, very preterm, extremely preterm, vs. normal term) | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.9 (95% CI: 0.89 to 0.91), p=NR  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Non-Hispanic, other race | Arm 1 | Did not receive WIC benefits during pregnancy | Ordinal variable for gestational age cat (moderate-to-late preterm, very preterm, extremely preterm, vs. normal term) | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: Ref  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Non-Hispanic, other race | Arm 2 | Received WIC benefits during pregnancy        | Ordinal variable for gestational age cat (moderate-to-late preterm, very preterm, extremely preterm, vs. normal term) | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.94 (95% CI: 0.92 to 0.96), p=NR | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |

| Author, Year                 | Subgroup | Arm     | Arm Name                                      | Outcome Definition         | Tool | N at Analysis | Followup Outcome, n(%)                          | Within-group Difference                           | Between-group Difference       | Adjusted Factors  |
|------------------------------|----------|---------|---|----------------------------|------|---------------|---|---|--------------------------------|---|
| Soneji, 2019 <sup>15</sup>   | NA       | Arm 1   | Did not receive WIC benefits during pregnancy | Very preterm (28-32 weeks) | NA   | NR            | Followup timepoint: NA<br>Outcome: 46873 (1.7)  | Not reported                                      | Comparator: Ref                | 0   |
| Soneji, 2019 <sup>15</sup>   | NA       | Arm 2   | Received WIC benefits during pregnancy        | Very preterm (28-32 weeks) | NA   | NR            | Followup timepoint: NA<br>Outcome: 105448 (1.3) | Not reported                                      | Comparator: 2 vs. 1<br>p<0.001 | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup>   | NA       | Overall | All medicaid-insured expectant mothers        | Very preterm (28-32 weeks) | NA   | NR            | Followup timepoint: NA<br>Outcome: 155685 (1.4) | Not reported                                      | Comparator: NA                 | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soncha k, 2016 <sup>13</sup> | Black    | Overall | Overall arm                                   | Preterm                    | NA   | 6713          | Followup timepoint: birth<br>Outcome: NR        | % change from baseline: -0.038 (SE 0.005), p<0.01 | Comparator: NR                 | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year  |

| Author, Year                 | Subgroup | Arm     | Arm Name                                      | Outcome Definition                                       | Tool | N at Analysis | Followup Outcome, n(%)                   | Within-group Difference                           | Between-group Difference                                     | Adjusted Factors  |
|------------------------------|----------|---------|---|--|------|---------------|--|---|--|---|
| Soncha k, 2016 <sup>13</sup> | No       | Overall | Overall arm                                   | Preterm  | NA   | 12661         | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.034 (SE 0.004), p<0.01 | Comparator: NR   | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year  |
| Soncha k, 2016 <sup>13</sup> | White    | Overall | Overall arm                                   | Preterm  | NA   | 5948          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.03 (SE 0.005), p<0.01  | Comparator: NR   | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year  |
| Soneji, 2019 <sup>15</sup>   | NA       | Arm 1   | Did not receive WIC benefits during pregnancy | Preterm birth compared with normal gestational age birth | NA   | NR            | Followup timepoint: NA<br>Outcome: NR    | Not reported                                      | Comparator: Ref  | OR: sociodemographic characteristics, clinical risk factors, receipt of prenatal care, maternal smoking   |
| Soneji, 2019 <sup>15</sup>   | NA       | Arm 2   | Received WIC benefits during pregnancy        | Preterm birth compared with normal gestational age birth | NA   | NR            | Followup timepoint: NA<br>Outcome: NR    | Not reported                                      | Comparator: 2 vs. 1<br>OR: 0.87 (95% CI: 0.86 to 0.87), p=NR | OR: sociodemographic characteristics, clinical risk factors, receipt of prenatal care, maternal smoking   |
| Soneji, 2019 <sup>15</sup>   | NA       | Overall | All Medicaid-insured expectant mothers        | Preterm birth compared with normal gestational age birth | NA   | NR            | Followup timepoint: NA<br>Outcome: NR    | Not reported                                      | Comparator: NA   | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition                            | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference | Adjusted Factors                                      |
|---------------------------|--|-------|---------------------------------|---|------|---------------|---|-------------------------|--------------------------|---|
| Fingar, 2017 <sup>6</sup> | NR   | Arm 1 | Did not redeem during pregnancy | Prevalence of preterm birth among live births | NR   | 18340         | Followup timepoint: Week 4 through the end of pregnancy<br>Outcome: 1278 (7)    | Not reported            | Comparator: NR           | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | WIC enrollment 1st trimester (<14 weeks)                               | Arm 2 | Redeemed during pregnancy       | Prevalence of preterm birth among live births | NR   | 112348        | Followup timepoint: Week 4 through the end of pregnancy<br>Outcome: 8089 (7.2)  | Not reported            | Comparator: NR           | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | WIC enrollment 2nd trimester (14-27 weeks)                             | Arm 2 | Redeemed during pregnancy       | Prevalence of preterm birth among live births | NR   | 68363         | Followup timepoint: Week 4 through the end of pregnancy<br>Outcome: 4520 (6.6)  | Not reported            | Comparator: NR           | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | WIC enrollment 3rd trimester (27 weeks-birth)                          | Arm 2 | Redeemed during pregnancy       | Prevalence of preterm birth among live births | NR   | 25932         | Followup timepoint: Week 4 through the end of pregnancy<br>Outcome: 1175 (4.5)  | Not reported            | Comparator: NR           | Maternal socio-demographic and health characteristics |
| Fingar, 2017 <sup>6</sup> | WIC enrollment Postpartum (birth-46 weeks after last menstrual period) | Arm 2 | Redeemed during pregnancy       | Prevalence of preterm birth among live births | NR   | 10548         | Followup timepoint: Week 4 through the end of pregnancy<br>Outcome: 1467 (13.9) | Not reported            | Comparator: NR           | Maternal socio-demographic and health characteristics |

| Author, Year              | Subgroup | Arm     | Arm Name                        | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                     | Within-group Difference                | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|---------|---------------------------------|---|------|---------------|--|--|--|--|
| Fingar, 2017 <sup>6</sup> | NR       | Arm 1   | Did not redeem during pregnancy | Prevalence of preterm birth among live births, between arm comparison | NR   | NR            | Followup timepoint: week 29<br>Outcome: NR | Not reported                           | Comparator: Ref  | Maternal socio-demographic and health characteristics  |
| Fingar, 2017 <sup>6</sup> | NR       | Arm 2   | Redeemed during pregnancy       | Prevalence of preterm birth among live births, between arm comparison | NR   | NR            | Followup timepoint: week 29<br>Outcome: NR | Not reported                           | Comparator: Arm1<br>Survival model HR: 0.71 (95% CI: 0.51 to 0.98), p=NR | Maternal socio-demographic and health characteristics  |
| Fingar, 2017 <sup>6</sup> | NR       | Arm 1   | Did not redeem during pregnancy | Prevalence of preterm birth among live births, between arm comparison | NR   | NR            | Followup timepoint: week 36<br>Outcome: NR | Not reported                           | Comparator: Ref  | Maternal socio-demographic and health characteristics  |
| Fingar, 2017 <sup>6</sup> | NR       | Arm 2   | Redeemed during pregnancy       | Prevalence of preterm birth among live births, between arm comparison | NR   | NR            | Followup timepoint: week 36<br>Outcome: NR | Not reported                           | Comparator: Arm1<br>Survival model HR: 0.52 (95% CI: 0.33 to 0.82), p=NR | Maternal socio-demographic and health characteristics  |
| Testa, 2020 <sup>16</sup> | NR       | overall | Public assistance               | <37 weeks   | 0    | 200219        | Followup timepoint: NA<br>Outcome: NA      | OR: 0.82; (95% CI, 0.70 to 0.95), p=NA | Comparator: NR   | Models control for maternal race, maternal age, college graduate, married, number of prior births, pregnancy planned, prepregnancy body mass index, income levels, state of residence, and year of birth |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-147. Infant birthweight categorical outcomes of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Sub-group | Arm   | Arm Name                        | Outcome Definition              | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|---------------------------------|---------------------------------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | Asian     | Arm 1 | Infant born before WIC revision | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian     | Arm 2 | Infant born after WIC revision  | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.52 (95% CI: -1.7 to 0.7), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black     | Arm 1 | Infant born before WIC revision | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black     | Arm 2 | Infant born after WIC revision  | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.46 (95% CI: -2.3 to 1.4), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic  | Arm 1 | Infant born before WIC revision | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic  | Arm 2 | Infant born after WIC revision  | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 1.1 (95% CI: 0.43 to 1.8), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR        | Arm 1 | Infant born before WIC revision | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |

| Author, Year              | Sub-group  | Arm   | Arm Name                        | Outcome Definition              | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|---------------------------------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.94 (95% CI: 0.55 to 1.3), p=NR  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.59 (95% CI: -1.4 to 2.6), p=NR  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Appropriate for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 1 (95% CI: 0.17 to 1.8), p=NR     | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian      | Arm 1 | Infant born before WIC revision | Large for gestational age       | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian      | Arm 2 | Infant born after WIC revision  | Large for gestational age       | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.34 (95% CI: -0.36 to 1.0), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black      | Arm 1 | Infant born before WIC revision | Large for gestational age       | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |



| Author, Year              | Sub-group  | Arm   | Arm Name                        | Outcome Definition        | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|---------------------------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | Black      | Arm 2 | Infant born after WIC revision  | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.067 (95% CI: -1.1 to 1.2), p=NR     | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic   | Arm 1 | Infant born before WIC revision | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic   | Arm 2 | Infant born after WIC revision  | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.53 (95% CI: -1.1 to -0.0077), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 1 | Infant born before WIC revision | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.52 (95% CI: -0.81 to -0.23), p=NR  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.66 (95% CI: -0.87 to 2.2), p=NR     | Mother's education, age, and parity and infant's sex and year of birth                 |

| Author, Year              | Sub-group | Arm   | Arm Name                        | Outcome Definition        | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|---------------------------------|---------------------------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | White     | Arm 1 | Infant born before WIC revision | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | White     | Arm 2 | Infant born after WIC revision  | Large for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.98 (95% CI: -1.6 to -0.33), p=NR | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Asian     | Arm 1 | Infant born before WIC revision | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Asian     | Arm 2 | Infant born after WIC revision  | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.18 (95% CI: -0.82 to 1.2), p=NR   | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Black     | Arm 1 | Infant born before WIC revision | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Black     | Arm 2 | Infant born after WIC revision  | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.4 (95% CI: -1.1 to 1.8), p=NR     | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Hispanic  | Arm 1 | Infant born before WIC revision | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Hispanic  | Arm 2 | Infant born after WIC revision  | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.58 (95% CI: -1.0 to -0.13), p=NR | Mother's education, age, and parity and infant's sex and year of birth |

| Author, Year              | Sub-group  | Arm   | Arm Name                        | Outcome Definition        | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|---------------------------|---------------|---------------------------------------|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 1 | Infant born before WIC revision | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.42 (95% CI: -0.69 to -0.15), p=NR | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -1.3 (95% CI: -2.5 to 0.027), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Small for gestational age | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.02 (95% CI: -0.55 to 0.51), p=NR  | Mother's education, age, and parity and infant's sex and year of birth                 |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-148. Infant birthweight continuous outcomes of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Sub-group | Arm     | Arm Name    | Outcome Definition            | Tool | N                               | Followup Outcome  | Within-group Difference                              | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|---------|-------------|-------------------------------|------|---------------------------------|---|--|--------------------------|---|
| Sonchak, 2016 <sup>13</sup> | Black     | Overall | Overall arm | Birthweight                   | NA   | Baseline: 6713<br>Followup: NR  | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 69.951 (SE 7.853), p<0.01 | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year                  |
| Sonchak, 2016 <sup>13</sup> | No        | Overall | Overall arm | Birthweight                   | NA   | Baseline: 12661<br>Followup: NR | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 51.638 (SE 5.32), p<0.01  | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year                  |
| Sonchak, 2016 <sup>13</sup> | White     | Overall | Overall arm | Birthweight                   | NA   | Baseline: 5948<br>Followup: NR  | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 38.63 (SE 7.401), p<0.01  | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year                  |
| Sonchak, 2016 <sup>13</sup> | Black     | Overall | Overall arm | Birthweight   gestational age | NA   | Baseline: 6713<br>Followup: NR  | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 7.391 (SE 5.041), pNS     | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |
| Sonchak, 2016 <sup>13</sup> | No        | Overall | Overall arm | Birthweight   gestational age | NA   | Baseline: 12661<br>Followup: NR | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 7.626 (SE 3.731), p<0.05  | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |
| Sonchak, 2016 <sup>13</sup> | White     | Overall | Overall arm | Birthweight   gestational age | NA   | Baseline: 5948<br>Followup: NR  | Followup timepoint: NA<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: 8.031 (SE 5.545), pNS     | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |

| Author, Year             | Sub-group | Arm   | Arm Name              | Outcome Definition     | Tool | N                                | Followup Outcome  | Within-group Difference                                       | Between-group Difference   | Adjusted Factors  |
|--------------------------|-----------|-------|-----------------------|------------------------|------|----------------------------------|---|---|--|---|
| Rhee, 2019 <sup>12</sup> | NR        | Arm 1 | Non-WIC participation | Changes in birthweight | NR   | Baseline: 2836<br>Followup: 2836 | Followup timepoint: During 2nd trimester<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: -18.3 (95% CI: -45.6 to 9.1), p=NR | Comparator: Ref  | Maternal age, body mass index (BMI), race/ethnicity, nativity, education, smoking history, insurance, marital status, child gestational age and sex, seasonality, and median household income |
| Rhee, 2019 <sup>12</sup> | NR        | Arm 2 | WIC participation     | Changes in birthweight | NR   | Baseline: 530<br>Followup: 530   | Followup timepoint: During 2nd trimester<br>Outcome: Baseline: NR<br>Followup: NR | Mean change from baseline: -6.9 (95% CI: -18.5 to 4.7), p=NR  | Comparator: Arm1<br>Mean difference from baseline: 36 (95% CI: -7.3 to 79.4), p=NS | Maternal age, body mass index (BMI), race/ethnicity, nativity, education, smoking history, insurance, marital status, child gestational age and sex, seasonality, and median household income |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-149. Infant birthweight continuous outcomes of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Sub-group | Arm   | Arm Name                        | Outcome Definition          | Tool | N                            | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|---------------------------------|-----------------------------|------|------------------------------|---|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | Asian     | Arm 1 | Infant born before WIC revision | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian     | Arm 2 | Infant born after WIC revision  | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Change in percentage points, Z-score: -0.003 (95% CI: -0.026 to 0.020), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black     | Arm 1 | Infant born before WIC revision | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black     | Arm 2 | Infant born after WIC revision  | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Change in percentage points, Z-score: -0.051 (95% CI: -0.086 to -0.0161), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic  | Arm 1 | Infant born before WIC revision | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic  | Arm 2 | Infant born after WIC revision  | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Change in percentage points, Z-score: -0.0029 (95% CI: -0.016 to 0.11), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR        | Arm 1 | Infant born before WIC revision | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |

| Author, Year              | Sub-group  | Arm   | Arm Name                        | Outcome Definition          | Tool | N                            | Followup Outcome  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|-----------------------------|------|------------------------------|---|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Change in percentage points, Z-score: -0.009 (95% CI: -0.016 to -0.001), p=NR | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Change in percentage points, Z-score: 0.016 (95% CI: -0.022 to 0.055), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Birth weight, not specified | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Change in percentage points, Z-score: -0.03 (95% CI: -0.046 to -0.013), p=NR  | Mother's education, age, and parity and infant's sex and year of birth                 |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-150. Infant birthweight categorical outcomes (low birthweight) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition   | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference                               | Adjusted Factors                                      |
|---------------------------|--|-------|---------------------------------|--|---------------|---|-------------------------|--|---|
| Fingar, 2017 <sup>6</sup> | NR   | Arm 1 | Did not redeem during pregnancy | Prevalence of low birth weight among live births                       | 18340         | Followup timepoint: End of pregnancy Outcome: 1045 (5.7)              | Not reported            | Comparator: NR   | NR  |
| Fingar, 2017 <sup>6</sup> | WIC enrollment 1st trimester (<14 weeks)                               | Arm 2 | Redeemed during pregnancy       | Prevalence of low birth weight among live births                       | 112348        | Followup timepoint: End of pregnancy Outcome: 6046 (5.4)              | Not reported            | Comparator: NR   | NR  |
| Fingar, 2017 <sup>6</sup> | WIC enrollment 2nd trimester (14-27 weeks)                             | Arm 2 | Redeemed during pregnancy       | Prevalence of low birth weight among live births                       | 68363         | Followup timepoint: End of pregnancy Outcome: 3708 (5.4)              | Not reported            | Comparator: NR   | NR  |
| Fingar, 2017 <sup>6</sup> | WIC enrollment 3rd trimester (27 weeks-birth)                          | Arm 2 | Redeemed during pregnancy       | Prevalence of low birth weight among live births                       | 25932         | Followup timepoint: End of pregnancy Outcome: 1068 (4.1)              | Not reported            | Comparator: NR   | NR  |
| Fingar, 2017 <sup>6</sup> | WIC enrollment Postpartum (birth-46 weeks after last menstrual period) | Arm 2 | Redeemed during pregnancy       | Prevalence of low birth weight among live births                       | 10548         | Followup timepoint: End of pregnancy Outcome: 1141 (10.8)             | Not reported            | Comparator: NR   | NR  |
| Fingar, 2017 <sup>6</sup> | NR   | Arm 1 | Did not redeem during pregnancy | Prevalence of low birth weight among live births, Odds ratio           | 18340         | Followup timepoint: End of pregnancy Outcome: 1045 (5.7)              | Not reported            | Comparator: Ref  | Gestational age at birth                              |
| Fingar, 2017 <sup>6</sup> | NR   | Arm 2 | Redeemed during pregnancy       | Prevalence of low birth weight among live births, Odds ratio           | 217191        | Followup timepoint: End of pregnancy Outcome: 11963 (5.5080551219894) | Not reported            | Comparator: Arm1 OR: 0.96 (95% CI: 0.88 to 1.03), p=NR | Gestational age at birth                              |
| Fingar, 2017 <sup>6</sup> | NR   | Arm 1 | Did not redeem during pregnancy | Prevalence of low birth weight among live births, Cox model regression | 18340         | Followup timepoint: End of pregnancy Outcome: 1045 (5.7)              | Not reported            | Comparator: Ref  | Maternal socio-demographic and health characteristics |



| Author, Year                | Subgroup | Arm     | Arm Name                        | Outcome Definition   | N at Analysis | Followup Outcome, n(%)   | Within-group Difference                           | Between-group Difference   | Adjusted Factors   |
|-----------------------------|----------|---------|---------------------------------|--|---------------|--|---|--|--|
| Fingar, 2017 <sup>6</sup>   | NR       | Arm 2   | Redeemed during pregnancy       | Prevalence of low birth weight among live births, Cox model regression | 217191        | Followup timepoint: End of pregnancy<br>Outcome: 11963 (5.5080551219894) | Not reported                                      | Comparator: Arm1<br>Cox proportional hazard: 0.81: NR (95% CI: 0.69 to 0.97), p=NR | Maternal socio-demographic and health characteristics                            |
| Fingar, 2017 <sup>6</sup>   | NR       | Arm 1   | Did not redeem during pregnancy | Prevalence of low birth weight among live births                       | NR            | Followup timepoint: week 26<br>Outcome: NR                               | Not reported                                      | Comparator: Ref  | Maternal socio-demographic and health characteristics                            |
| Fingar, 2017 <sup>6</sup>   | NR       | Arm 2   | Redeemed during pregnancy       | Prevalence of low birth weight among live births                       | NR            | Followup timepoint: week 26<br>Outcome: NR                               | Not reported                                      | Comparator: Arm1<br>Survival model HR: 0.77: NR (95% CI: 0.59 to 0.997), p=NR      | Maternal socio-demographic and health characteristics                            |
| Fingar, 2017 <sup>6</sup>   | NR       | Arm 1   | Did not redeem during pregnancy | Prevalence of low birth weight among live births                       | NR            | Followup timepoint: week 40<br>Outcome: NR                               | Not reported                                      | Comparator: Ref  | Maternal socio-demographic and health characteristics                            |
| Fingar, 2017 <sup>6</sup>   | NR       | Arm 2   | Redeemed during pregnancy       | Prevalence of low birth weight among live births                       | NR            | Followup timepoint: week 40<br>Outcome: NR                               | Not reported                                      | Comparator: Arm1<br>Survival model HR: 0.64: NR (95% CI: 0.42 to 0.96), p=NR       | Maternal socio-demographic and health characteristics                            |
| Sonchak, 2016 <sup>13</sup> | Black    | Overall | Overall arm                     | Low weight   | 6713          | Followup timepoint: birth<br>Outcome: NR                                 | % change from baseline: -0.034 (SE 0.005), p<0.01 | Comparator: NR   | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year |
| Sonchak, 2016 <sup>13</sup> | No       | Overall | Overall arm                     | Low weight   | 12661         | Followup timepoint: birth<br>Outcome: NR                                 | % change from baseline: -0.025 (SE 0.003), p<0.01 | Comparator: NR   | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year |

| Author, Year                | Subgroup | Arm     | Arm Name    | Outcome Definition           | N at Analysis | Followup Outcome, n(%)                   | Within-group Difference                           | Between-group Difference | Adjusted Factors  |
|-----------------------------|----------|---------|-------------|------------------------------|---------------|--|---|--------------------------|---|
| Sonchak, 2016 <sup>13</sup> | White    | Overall | Overall arm | Low weight                   | 5948          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.014 (SE 0.004), p<0.01 | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year                  |
| Sonchak, 2016 <sup>13</sup> | Black    | Overall | Overall arm | Low weight   gestational age | 6713          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.007 (SE -0.004), p=NS  | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |
| Sonchak, 2016 <sup>13</sup> | No       | Overall | Overall arm | Low weight   gestational age | 12661         | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.004 (SE -0.003), p=NS  | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |
| Sonchak, 2016 <sup>13</sup> | White    | Overall | Overall arm | Low weight   gestational age | 5948          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: 0 (SE -0.004), p<0.1      | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |
| Sonchak, 2016 <sup>13</sup> | Black    | Overall | Overall arm | Small for gestational age    | 6713          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.009 (SE 0.005), p=NS   | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |

| Author, Year                | Subgroup | Arm     | Arm Name          | Outcome Definition        | N at Analysis | Followup Outcome, n(%)                   | Within-group Difference                          | Between-group Difference | Adjusted Factors   |
|-----------------------------|----------|---------|-------------------|---------------------------|---------------|--|--|--------------------------|--|
| Sonchak, 2016 <sup>13</sup> | No       | Overall | Overall arm       | Small for gestational age | 12661         | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.005 (SE 0.004), p=NS  | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age  |
| Sonchak, 2016 <sup>13</sup> | White    | Overall | Overall arm       | Small for gestational age | 5948          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.001 (SE 0.005), p<0.1 | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age  |
| Testa, 2020 <sup>16</sup>   | NR       | overall | Public assistance | <2500 g                   | 200219        | Followup timepoint: NA<br>Outcome: NA    | OR: 0.846; (95% CI, 0.746-0.959), p<0.05         | Comparator: NR           | Models control for maternal race, maternal age, college graduate, married, number of prior births, pregnancy planned, prepregnancy body mass index, income levels, state of residence, and year of birth |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; Ref=reference; SE=standard error; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-151. Infant birthweight categorical outcomes (low birthweight) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Subgroup | Arm   | Arm Name                        | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|-------|---------------------------------|--------------------|------|---------------|---------------------------------------|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 1 | Infant born before WIC revision | Low birth weight   | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian    | Arm 2 | Infant born after WIC revision  | Low birth weight   | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.07 (95% CI: -0.66 to 0.8), p=NR    | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 1 | Infant born before WIC revision | Low birth weight   | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black    | Arm 2 | Infant born after WIC revision  | Low birth weight   | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.15 (95% CI: -1.1 to 1.4), p=NR     | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 1 | Infant born before WIC revision | Low birth weight   | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic | Arm 2 | Infant born after WIC revision  | Low birth weight   | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.26 (95% CI: -0.62 to 0.097), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR       | Arm 1 | Infant born before WIC revision | Low birth weight   | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition    | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|-----------------------|------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Low birth weight      | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.21 (95% CI: -0.42 to -0.004), p=NR | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Low birth weight      | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Low birth weight      | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.51 (95% CI: -1.5 to 0.51), p=NR    | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Low birth weight      | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Low birth weight      | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.2 (95% CI: -0.20 to 0.61), p=NR     | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian      | Arm 1 | Infant born before WIC revision | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian      | Arm 2 | Infant born after WIC revision  | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.048 (95% CI: -0.3 to 0.21), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition    | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|-----------------------|------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | Black      | Arm 1 | Infant born before WIC revision | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black      | Arm 2 | Infant born after WIC revision  | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.59 (95% CI: -0.033 to 1.2), p=NR    | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic   | Arm 1 | Infant born before WIC revision | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic   | Arm 2 | Infant born after WIC revision  | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.021 (95% CI: -0.13 to 0.17), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 1 | Infant born before WIC revision | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.079 (95% CI: -0.16 to 0.005), p=NR | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth                 |

| Author, Year              | Subgroup   | Arm   | Arm Name                        | Outcome Definition    | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|-----------------------|------|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.18 (95% CI: -0.60 to 0.24), p=NR   | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref   | Mother's education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Very low birth weight | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.073 (95% CI: -0.24 to 0.089), p=NR | Mother's education, age, and parity and infant's sex and year of birth |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; Ref=reference; SE=standard error; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-152. Infant birth complications categorical outcomes (hospitalization) of studies investigating the Key Question 1 association of the 2009 food package change with maternal, neonatal, and birth outcomes**

| Author, Year              | Sub-group | Arm   | Arm Name                        | Outcome Definition                          | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|-----------|-------|---------------------------------|---|---------------|---------------------------------------|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | Asian     | Arm 1 | Infant born before WIC revision | Infant readmitted in first year after birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian     | Arm 2 | Infant born after WIC revision  | Infant readmitted in first year after birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.32 (95% CI: -0.75 to 1.4), p=NR  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black     | Arm 1 | Infant born before WIC revision | Infant readmitted in first year after birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black     | Arm 2 | Infant born after WIC revision  | Infant readmitted in first year after birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -1.4 (95% CI: -2.9 to 0.066), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic  | Arm 1 | Infant born before WIC revision | Infant readmitted in first year after birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic  | Arm 2 | Infant born after WIC revision  | Infant readmitted in first year after birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.3 (95% CI: -0.87 to 0.27), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR        | Arm 1 | Infant born before WIC revision | Infant readmitted in first year after birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |



| Author, Year              | Sub-group  | Arm   | Arm Name                        | Outcome Definition                             | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|--|---------------|---------------------------------------|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Infant readmitted in first year after birth    | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.056 (95% CI: -0.39 to 0.27), p=NR | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Infant readmitted in first year after birth    | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Infant readmitted in first year after birth    | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -1 (95% CI: -2.6 to 0.62), p=NR      | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Infant readmitted in first year after birth    | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 2 | Infant born after WIC revision  | Infant readmitted in first year after birth    | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.083 (95% CI: -0.78 to 0.61), p=NR | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian      | Arm 1 | Infant born before WIC revision | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Asian      | Arm 2 | Infant born after WIC revision  | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.072 (95% CI: -0.94 to 1.1), p=NR   | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Black      | Arm 1 | Infant born before WIC revision | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |

| Author, Year              | Sub-group  | Arm   | Arm Name                        | Outcome Definition                             | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|------------|-------|---------------------------------|--|---------------|---------------------------------------|-------------------------|--|--|
| Hamad, 2019 <sup>18</sup> | Black      | Arm 2 | Infant born after WIC revision  | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.33 (95% CI: -1.2 to 1.9), p=NR     | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic   | Arm 1 | Infant born before WIC revision | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Hispanic   | Arm 2 | Infant born after WIC revision  | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.38 (95% CI: -0.49 to 0.15), p=NR  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 1 | Infant born before WIC revision | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | NR         | Arm 2 | Infant born after WIC revision  | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.001 (95% CI: -0.31 to 0.31), p=NR | Mother's race/ethnicity, education, age, and parity and infant's sex and year of birth |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 1 | Infant born before WIC revision | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | Other race | Arm 2 | Infant born after WIC revision  | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: -0.53 (95% CI: -2.1 to 1.0), p=NR    | Mother's education, age, and parity and infant's sex and year of birth                 |
| Hamad, 2019 <sup>18</sup> | White      | Arm 1 | Infant born before WIC revision | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Ref  | Mother's education, age, and parity and infant's sex and year of birth                 |

| Author, Year              | Sub-group | Arm   | Arm Name                       | Outcome Definition                             | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|--------------------------------|--|---------------|---------------------------------------|-------------------------|---|--|
| Hamad, 2019 <sup>18</sup> | White     | Arm 2 | Infant born after WIC revision | Longer than expected infant admission at birth | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>Change in percentage points: 0.35 (95% CI: -0.3 to 0.99), p=NR | Mother's education, age, and parity and infant's sex and year of birth |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; Ref=reference; SE=standard error; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-153. Infant birth complications categorical outcomes (NICU stay) of studies investigating the Key Question 1 association between maternal, neonatal, and birth outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Sub-group | Arm     | Arm Name    | Outcome Definition               | Tool | N at Analysis | Followup Outcome, n(%)                   | Within-group Difference                           | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|---------|-------------|----------------------------------|------|---------------|--|---|--------------------------|---|
| Sonchak, 2016 <sup>13</sup> | Black     | Overall | Overall arm | NICU admission                   | NA   | 6713          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.017 (SE 0.004), p<0.01 | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year                  |
| Sonchak, 2016 <sup>13</sup> | No        | Overall | Overall arm | NICU admission                   | NA   | 12661         | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.016 (SE 0.003), p<0.01 | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year                  |
| Sonchak, 2016 <sup>13</sup> | White     | Overall | Overall arm | NICU admission                   | NA   | 5948          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.015 (SE 0.004), p<0.01 | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year                  |
| Sonchak, 2016 <sup>13</sup> | Black     | Overall | Overall arm | NICU admission   gestational age | NA   | 6713          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: 0.002 (SE 0.002), p=NS    | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |
| Sonchak, 2016 <sup>13</sup> | No        | Overall | Overall arm | NICU admission   gestational age | NA   | 12661         | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.001 (SE 0.002), p=NS   | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |
| Sonchak, 2016 <sup>13</sup> | White     | Overall | Overall arm | NICU admission   gestational age | NA   | 5948          | Followup timepoint: birth<br>Outcome: NR | % change from baseline: -0.005 (SE 0.004), p=NS   | Comparator: NR           | Child sex, maternal age, maternal education, pre-pregnancy smoking, parity, year, gestational age |

n=sample size; NA=not available; NICU=neonatal intensive care unit; NR=not reported; NS=non-significant; p=p-value; SE=standard error

**Evidence Table D-154. Infant and child mortality categorical outcomes (Live birth resulting in death within 1 year of life) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                                      | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                                     | Adjusted Factors  |
|----------------------------|----------|-------|---|---|------|---------------|---------------------------------------|-------------------------|--|---|
| Soneji, 2019 <sup>15</sup> | Hispanic | Arm 1 | Did not receive WIC benefits during pregnancy | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: Ref  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Hispanic | Arm 2 | Received WIC benefits during pregnancy        | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.85 (95% CI: 0.81 to 0.90), p=NR | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | NA       | Arm 1 | Did not receive WIC benefits during pregnancy | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: Ref  | OR: sociodemographic characteristics, clinical risk factors, receipt of prenatal care, maternal smoking, and gestational age at birth   |

| Author, Year               | Subgroup           | Arm     | Arm Name                                      | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|--------------------|---------|---|---|------|---------------|---------------------------------------|-------------------------|---|---|
| Soneji, 2019 <sup>15</sup> | NA                 | Arm 2   | Received WIC benefits during pregnancy        | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.84 (95% CI: 0.83 to 0.86), p=NR<br>RR: -0.366 (95% CI: NR) | OR: sociodemographic characteristics, clinical risk factors, receipt of prenatal care, maternal smoking, and gestational age at birth   |
| Soneji, 2019 <sup>15</sup> | NA                 | Overall | All medicaid-insured expectant mothers        | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: NA  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Non-Hispanic Black | Arm 1   | Did not receive WIC benefits during pregnancy | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: Ref   | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |

| Author, Year               | Subgroup           | Arm   | Arm Name                                      | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                                     | Adjusted Factors  |
|----------------------------|--------------------|-------|---|---|------|---------------|---------------------------------------|-------------------------|--|---|
| Soneji, 2019 <sup>15</sup> | Non-Hispanic Black | Arm 2 | Received WIC benefits during pregnancy        | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.91 (95% CI: 0.87 to 0.95), p=NR | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Non-Hispanic white | Arm 1 | Did not receive WIC benefits during pregnancy | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: Ref  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Non-Hispanic white | Arm 2 | Received WIC benefits during pregnancy        | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.9 (95% CI: 0.87 to 0.93), p=NR  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |

| Author, Year               | Subgroup                 | Arm   | Arm Name                                      | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                                     | Adjusted Factors  |
|----------------------------|--------------------------|-------|---|---|------|---------------|---------------------------------------|-------------------------|--|---|
| Soneji, 2019 <sup>15</sup> | Non-Hispanic, other race | Arm 1 | Did not receive WIC benefits during pregnancy | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: Ref  | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |
| Soneji, 2019 <sup>15</sup> | Non-Hispanic, other race | Arm 2 | Received WIC benefits during pregnancy        | Death within the first year of life among infants who were born alive | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.94 (95% CI: 0.87 to 1.02), p=NR | Year of delivery, age at delivery, educational attainment, marital status, prenatal care, pre-pregnancy diabetes, pre-pregnancy hypertension, gestational hypertension, hypertension eclampsia, gravida, para, aborta, plurality, cigarette smoking in 3 months prior to pregnancy, cigarette smoking during pregnancy, method of delivery, gestational age cat |

BMI=body mass index; CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-155. Infant and child general mortality categorical outcomes of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup | Arm   | Arm Name                                | Outcome Definition              | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                              | Adjusted Factors  |
|-----------------------------|----------|-------|---|---------------------------------|------|---------------|---------------------------------------|-------------------------|---|---|
| Oropesa, 2001 <sup>41</sup> | No       | Arm 1 | Living in poverty, WIC non-participants | Dying in the first year of life | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.27 (95% CI: NR), p<0.001 | Area poverty, prenatal care adequacy, prenatal care services, prenatal advice, method of payment                    |
| Oropesa, 2001 <sup>41</sup> | No       | Arm 2 | Living in poverty, WIC Participants     | Dying in the first year of life | NA   | NR            | Followup timepoint: NA<br>Outcome: NR | Not reported            | Comparator: 2 vs. 1<br>OR: 0.59 (95% CI: NR), p=NS    | Area poverty, prenatal care adequacy, prenatal care services, prenatal advice, method of payment, + low birthweight |

BMI=body mass index; CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-156. Infant and child morbidity categorical outcomes (child health fair/poor) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Sub-group | Arm   | Arm Name    | Outcome Definition   | Tool            | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------|--|-----------------|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC       | Arm 1 | 0 stressors | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 2 | 1 stressor  | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 1.62 (95% CI: 1.48-1.79), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Sub-group | Arm   | Arm Name    | Outcome Definition   | Tool            | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------|--|-----------------|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | No WIC    | Arm 1 | 0 stressors | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 2 | 1 stressor  | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 1.49 (95% CI: 1.13-1.96), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Sub-group | Arm   | Arm Name    | Outcome Definition   | Tool            | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------|--|-----------------|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC       | Arm 2 | 1 stressor  | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2                                       | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 3 | 2 stressors | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 1.4 (95% CI: 1.22-1.6), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Sub-group | Arm   | Arm Name    | Outcome Definition   | Tool            | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------|--|-----------------|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | No WIC    | Arm 2 | 1 stressor  | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 3 | 2 stressors | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 2.35 (95% CI: 1.66-3.33), p=0.05 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Sub-group | Arm          | Arm Name                  | Outcome Definition   | Tool            | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|-----------|--------------|---------------------------|--|-----------------|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | WIC       | Arms 2 and 1 | 1 stressor or 0 stressors | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 3        | 2 stressors               | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 1.89 (95% CI: 1.66-2.14), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Sub-group | Arm          | Arm Name                  | Outcome Definition   | Tool            | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|-----------|--------------|---------------------------|--|-----------------|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | No WIC    | Arms 2 and 1 | 1 stressor or 0 stressors | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 3        | 2 stressors               | "child health fair/poor" not defined well in article, but looks to utilize a single question from NHANES | NHANES question | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 2.35 (95% CI: 2.16-4.02), p=0.05 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

CI=confidence interval; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value;  
Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-157. Infant and child morbidity categorical outcomes (hospitalizations) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm 1 | 0 stressors | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 1.13 (95% CI: 1.05-1.21), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |



| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|------|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 1 | 0 stressors | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 1.3 (95% CI: 1.05-1.60), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm 3 | 2 stressors | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 1.18 (95% CI: 1.05-1.33), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3 | 2 stressors | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 1.16 (95% CI: 0.85-1.6), p>0.06  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm          | Arm Name                  | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|--------------|---------------------------|--|------|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | WIC      | Arms 2 and 1 | 1 stressor or 0 stressors | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 3        | 2 stressors               | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 1.29 (95% CI: 1.16-1.44), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arms 2 and 1 | 1 stressor or 0 stressors | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3 | 2 stressors | "hospitalizations" categories not defined well in article, but measured by caregiver report of lifetime hospitalizations excluding birth | NA   | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 1.4 (95% CI: 1.05-1.87), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-158. Infant and child morbidity categorical outcomes (well-child status) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Sub-group | Arm   | Arm Name    | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------|---|------|---------------|------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC       | Arm 1 | 0 stressors | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 21567         | NA                     | Not reported            | Comparator: Arm 2 vs. Arm 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 2 | 1 stressor  | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 21567         | NA                     | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 0.83 (95% CI: 0.76-0.92), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 1 | 0 stressors | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 2422          | NA                     | Not reported            | Comparator: Arm 2 vs. Arm 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 2 | 1 stressor  | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 2422          | NA                     | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 0.87 (95% CI: 0.66-1.15), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Sub-group | Arm   | Arm Name    | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|-----------|-------|-------------|---|------|---------------|------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | WIC       | Arm 2 | 1 stressor  | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 9073          | NA                     | Not reported            | Comparator: Arm 3 vs. Arm 2  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 3 | 2 stressors | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 9073          | NA                     | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 0.82 (95% CI: 0.7-0.96), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 2 | 1 stressor  | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 1266          | NA                     | Not reported            | Comparator: Arm 3 vs. Arm 2  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 3 | 2 stressors | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 1266          | NA                     | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 0.34 (95% CI: 0.2-0.58), p=0.05 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Sub-group | Arm          | Arm Name                  | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|-----------|--------------|---------------------------|---|------|---------------|------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | WIC       | Arms 2 and 1 | 1 stressor or 0 stressors | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 23661         | NA                     | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 3        | 2 stressors               | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 23661         | NA                     | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 0.73 (95% CI: 0.62-0.84), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arms 2 and 1 | 1 stressor or 0 stressors | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 2723          | NA                     | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 3        | 2 stressors               | Well-child status is a composite of no hospitalizations, not at risk of underweight, not overweight, good/excellent child health, and no developmental risk | NA   | 2723          | NA                     | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 0.34 (95% CI: 0.21-0.54), p=0.05 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-159. Infant and child anemia categorical outcomes of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Sub-group | Arm   | Arm Name                       | Outcome Definition      | Tool          | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference                                  | Adjusted Factors  |
|--------------------------|-----------|-------|--------------------------------|-------------------------|---------------|---------------|--|-------------------------|---|---|
| Smock,2020 <sup>43</sup> | NR        | Arm 1 | 2-4 number WIC visits, overall | % Recovered from anemia | anthropometry | NR            | Followup timepoint: visit to WIC between January 1998 - September 2010<br>Outcome: 62 (67) | NR                      | Comparator: Ref   | Caregiver sociodemographic characteristics and child age, breastfeeding history, and birth weight |
| Smock,2020 <sup>43</sup> | NR        | Arm 2 | 5+ number WIC visits, overall  | % Recovered from anemia | anthropometry | NR            | Followup timepoint: visit to WIC between January 1998 - September 2010<br>Outcome: 92 (93) | NR                      | Comparator: 2<br>OR: 6.5 (95% CI: 2.69-15.69),<br>p<0.001 | Caregiver sociodemographic characteristics and child age, breastfeeding history, and birth weight |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-160. Infant and child healthcare utilization categorical outcomes (immunizations) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name                               | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|----------------------------|----------|-------|--|---|------|---------------|---|-------------------------|---|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 1 | WIC eligible current participants 2007 | DTaP $\geq 4$   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (84 (SE 1.1)) | Not reported            | Comparator: Arm 2 (WIC eligible previous participant 2007) / WIC eligible never participated<br>$p < 0.05 / > 0.05$ | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 1 | WIC eligible current participants 2007 | Measles $\geq 1$  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (94 (SE 0.7)) | Not reported            | Comparator: Arm 2 (WIC eligible previous participant 2007) / WIC eligible never participated<br>$p < 0.05 / < 0.05$ | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 1 | WIC eligible current participants 2007 | Immunization coverage = Coverage defined as up to date on 4:3:1*:3:1:4 series= $\geq 4$ doses of DTaP, $\geq 3$ doses of poliovirus, $\geq 1$ dose of measles, $\geq 3$ doses of Hib, $\geq 3$ doses of HepB, $\geq 1$ dose of varicella, and $\geq 4$ doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (66 (SE 1.6)) | Not reported            | Comparator: Arm 2 (WIC eligible previous participant 2007) / WIC eligible never participated<br>$p < 0.05 / > 0.05$ | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |

| Author, Year               | Subgroup | Arm   | Arm Name                               | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|----------------------------|----------|-------|--|--|------|---------------|---|-------------------------|---|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 2 | WIC eligible prior participants 2007   | DTaP $\geq 4$  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (76 (SE 1.7)) | Not reported            | Comparator: WIC-eligible never participants<br>$p > 0.05$   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 2 | WIC eligible prior participants 2007   | Measles $\geq 1$   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (89 (SE 1.3)) | Not reported            | Comparator: WIC-eligible never participants<br>$p > 0.05$   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 2 | WIC eligible prior participants 2007   | Immunization coverage = Coverage defined as up to date on 4:3:1:*:3:1:4 series= $\geq 4$ doses of DTaP, $\geq 3$ doses of poliovirus, $\geq 1$ dose of measles, $\geq 3$ doses of Hib, $\geq 3$ doses of HepB, $\geq 1$ dose of varicella, and $\geq 4$ doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (59 (SE 1.8)) | Not reported            | Comparator: WIC-eligible never participants<br>$p > 0.05$   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 3 | WIC eligible current participants 2008 | DTaP $\geq 4$  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (83 (SE 1.2)) | Not reported            | Comparator: Arm 4 (WIC eligible previous participant 2008) / WIC eligible never participated<br>$p < 0.05$ / $< 0.05$ | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |

| Author, Year               | Subgroup | Arm   | Arm Name                               | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|----------------------------|----------|-------|--|---|------|---------------|---|-------------------------|---|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 3 | WIC eligible current participants 2008 | Measles $\geq 1$  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (94 (SE 0.8)) | Not reported            | Comparator: Arm 4 (WIC eligible previous participant 2008) / WIC eligible never participated<br>$p < 0.05$ / $< 0.05$ | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 3 | WIC eligible current participants 2008 | Immunization coverage = Coverage defined as up to date on 4:3:1*:3:1:4 series= $\geq 4$ doses of DTaP, $\geq 3$ doses of poliovirus, $\geq 1$ dose of measles, $\geq 3$ doses of Hib, $\geq 3$ doses of HepB, $\geq 1$ dose of varicella, and $\geq 4$ doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (69 (SE 1.5)) | Not reported            | Comparator: Arm 4 (WIC eligible previous participant 2008) / WIC eligible never participated<br>$p < 0.05$ / $> 0.05$ | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 4 | WIC eligible prior participants 2008   | DTaP $\geq 4$   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (78 (SE 1.6)) | Not reported            | Comparator: WIC-eligible never participants<br>$p > 0.05$   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 4 | WIC eligible prior participants 2008   | Measles $\geq 1$  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (90 (SE 1.3)) | Not reported            | Comparator: WIC-eligible never participants<br>$p > 0.05$   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |

| Author, Year               | Subgroup | Arm   | Arm Name                               | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|----------------------------|----------|-------|--|---|------|---------------|---|-------------------------|--|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 4 | WIC eligible prior participants 2008   | Immunization coverage = Coverage defined as up to date on 4:3:1*:3:1:4 series= ≥4 doses of DTaP, ≥3 doses of poliovirus, ≥1 dose of measles, ≥3 doses of Hib, ≥3 doses of HepB, ≥1 dose of varicella, and ≥4 doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (63 (SE 1.9)) | Not reported            | Comparator: WIC-eligible never participants<br>p> 0.05   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 5 | WIC eligible current participants 2009 | DTaP ≥4   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (83 (SE 1.1)) | Not reported            | Comparator: Arm 6 (WIC eligible previous participant 2009) / WIC eligible never participated<br>p< 0.05 / < 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 5 | WIC eligible current participants 2009 | Measles ≥ 1   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (93 (SE 0.8)) | Not reported            | Comparator: Arm 6 (WIC eligible previous participant 2009) / WIC eligible never participated<br>p> 0.05 / < 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |

| Author, Year               | Subgroup | Arm   | Arm Name                               | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|----------------------------|----------|-------|--|--|------|---------------|---|-------------------------|--|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 5 | WIC eligible current participants 2009 | Immunization coverage = Coverage defined as up to date on 4:3:1:*:3:1:4 series= ≥4 doses of DTaP, ≥3 doses of poliovirus, ≥1 dose of measles, ≥3 doses of Hib, ≥3 doses of HepB, ≥1 dose of varicella, and ≥4 doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (72 (SE 1.4)) | Not reported            | Comparator: Arm 6 (WIC eligible previous participant 2009) / WIC eligible never participated<br>p< 0.05 / < 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 6 | WIC eligible prior participants 2009   | DTaP ≥4  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (76 (SE 1.7)) | Not reported            | Comparator: WIC-eligible never participants<br>p< 0.05   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 6 | WIC eligible prior participants 2009   | Measles ≥ 1  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (90 (SE 1.1)) | Not reported            | Comparator: WIC-eligible never participants<br>p< 0.05   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |

| Author, Year               | Subgroup | Arm   | Arm Name                               | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|----------------------------|----------|-------|--|---|------|---------------|---|-------------------------|--|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 6 | WIC eligible prior participants 2009   | Immunization coverage = Coverage defined as up to date on 4:3:1*:3:1:4 series= ≥4 doses of DTaP, ≥3 doses of poliovirus, ≥1 dose of measles, ≥3 doses of Hib, ≥3 doses of HepB, ≥1 dose of varicella, and ≥4 doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (62 (SE 1.9)) | Not reported            | Comparator: WIC-eligible never participants<br>p< 0.05   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 7 | WIC eligible current participants 2010 | DTaP ≥4   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (82 (SE 1.3)) | Not reported            | Comparator: Arm 8 (WIC eligible previous participant 2010) / WIC eligible never participated<br>p< 0.05 / > 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 7 | WIC eligible current participants 2010 | Measles ≥ 1   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (93 (SE 0.8)) | Not reported            | Comparator: Arm 8 (WIC eligible previous participant 2010) / WIC eligible never participated<br>p< 0.05 / > 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |

| Author, Year               | Subgroup | Arm   | Arm Name                               | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|----------------------------|----------|-------|--|--|------|---------------|---|-------------------------|--|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 7 | WIC eligible current participants 2010 | Immunization coverage = Coverage defined as up to date on 4:3:1:*:3:1:4 series= ≥4 doses of DTaP, ≥3 doses of poliovirus, ≥1 dose of measles, ≥3 doses of Hib, ≥3 doses of HepB, ≥1 dose of varicella, and ≥4 doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (64 (SE 1.5)) | Not reported            | Comparator: Arm 8 (WIC eligible previous participant 2010) / WIC eligible never participated<br>p> 0.05 / > 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 8 | WIC eligible prior participants 2010   | DTaP ≥4  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (77 (SE 1.7)) | Not reported            | Comparator: WIC-eligible never participants<br>p> 0.05   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 8 | WIC eligible prior participants 2010   | Measles ≥ 1  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (90 (SE 1.1)) | Not reported            | Comparator: WIC-eligible never participants<br>p> 0.05   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |

| Author, Year               | Subgroup | Arm   | Arm Name                               | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|----------------------------|----------|-------|--|---|------|---------------|---|-------------------------|---|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 8 | WIC eligible prior participants 2010   | Immunization coverage = Coverage defined as up to date on 4:3:1*:3:1:4 series= ≥4 doses of DTaP, ≥3 doses of poliovirus, ≥1 dose of measles, ≥3 doses of Hib, ≥3 doses of HepB, ≥1 dose of varicella, and ≥4 doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (63 (SE 1.9)) | Not reported            | Comparator: WIC-eligible never participants<br>p> 0.05  | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 9 | WIC eligible current participants 2011 | DTaP ≥4   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (84 (SE 1.1)) | Not reported            | Comparator: Arm 10 (WIC eligible previous participant 2011) / WIC eligible never participated<br>p< 0.05 / < 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 9 | WIC eligible current participants 2011 | Measles ≥ 1   | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (94 (SE 0.7)) | Not reported            | Comparator: Arm 10 (WIC eligible previous participant 2011) / WIC eligible never participated<br>p< 0.05 / < 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |



| Author, Year               | Subgroup | Arm    | Arm Name                               | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|----------------------------|----------|--------|--|--|------|---------------|---|-------------------------|---|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 9  | WIC eligible current participants 2011 | Immunization coverage = Coverage defined as up to date on 4:3:1:*:3:1:4 series= ≥4 doses of DTaP, ≥3 doses of poliovirus, ≥1 dose of measles, ≥3 doses of Hib, ≥3 doses of HepB, ≥1 dose of varicella, and ≥4 doses of PCV, excluding Hib. | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (71 (SE 1.4)) | Not reported            | Comparator: Arm 10 (WIC eligible previous participant 2011) / WIC eligible never participated<br>p< 0.05 / < 0.05 | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 10 | WIC eligible prior participants 2011   | DTaP ≥4  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (77 (SE 1.7)) | Not reported            | Comparator: WIC-eligible never participants<br>p< 0.05  | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Thomas, 2014 <sup>46</sup> | NR       | Arm 10 | WIC eligible prior participants 2011   | Measles ≥ 1  | NA   | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (90 (SE 1.2)) | Not reported            | Comparator: WIC-eligible never participants<br>p< 0.05  | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |

| Author, Year               | Subgroup | Arm    | Arm Name                             | Outcome Definition  | Tool                  | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|----------------------------|----------|--------|--------------------------------------|---|-----------------------|---------------|---|-------------------------|--|--|
| Thomas, 2014 <sup>46</sup> | NR       | Arm 10 | WIC eligible prior participants 2011 | Immunization coverage = Coverage defined as up to date on 4:3:1*:3:1:4 series= ≥4 doses of DTaP, ≥3 doses of poliovirus, ≥1 dose of measles, ≥3 doses of Hib, ≥3 doses of HepB, ≥1 dose of varicella, and ≥4 doses of PCV, excluding Hib. | NA                    | NR            | Followup timepoint: 24 months of age<br>Outcome: NR (64 (SE 1.9)) | Not reported            | Comparator: WIC-eligible never participants<br>p< 0.05   | race, mother's age and education, region, health insurance, and immunization facility; also weighted to account for sampling |
| Bersak, 2018 <sup>25</sup> | NR       | Arm 1  | WIC                                  | Probability of one vaccination during first year of life  | vaccination CPT codes | 229934        | Followup timepoint: 2004-2012<br>Outcome: NR (0.739 (0.439))      | NR                      | Comparator: Difference Non-WIC vs WIC<br>Probability of One Vaccination -0.01 (SE 0.002)<br>p=NR | NR   |
| Bersak, 2018 <sup>25</sup> | NR       | Arm 1  | WIC                                  | Number of vaccinations during the first year of life  | vaccination CPT codes | 229934        | Followup timepoint: 2004-2012<br>Outcome: 4.480 (3.451) (NR)      | NR                      | Comparator: Difference Non-WIC vs WIC # Vaccinations -0.211 (SE 0.016)<br>p=NR                   | NR   |

| Author, Year                 | Subgroup | Arm   | Arm Name                        | Outcome Definition  | Tool                  | N at Analysis | Followup Outcome, n(%)                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------|-------|---------------------------------|---|-----------------------|---------------|--|-------------------------|---|--|
| Bersak, 2018 <sup>25</sup>   | NR       | Arm 2 | Non-WIC                         | Probability of one vaccination during first year of life  | vaccination CPT codes | 60443         | Followup timepoint: 2004-2012<br>Outcome: NR (0.729 (0.445)) | NR                      | Comparator: OLS/Maternal FE<br>#Vaccination Non-WIC vs WIC<br>0.0148/0.0136 (SE 0.00213/0.00365)<br>p≤0.01          | same as above  |
| Bersak, 2018 <sup>25</sup>   | NR       | Arm 2 | Non-WIC                         | Number of vaccinations during the first year of life  | vaccination CPT codes | 60443         | Followup timepoint: 2004-2012<br>Outcome: 4.270 (3.411) (NR) | NR                      | Comparator: OLS/Maternal FE<br>Probability 1 Vaccination Non-WIC vs WIC<br>0.230/0.220 (SE 0.0164/0.0258)<br>p≤0.01 | same as above  |
| Casillas, 2017 <sup>27</sup> | NR       | Arm 1 | No, never received WIC benefits | 1 missed opportunity for vaccination for Hepatitis A, defined as visit made to receive another vaccine when child could have received Hepatitis A vaccination | NR                    | NR            | Followup timepoint: NR<br>Outcome: NR                        | Not reported            | Comparator: Ref   | child sex, child age category, child race/ethnicity, child first born status, maternal age category, maternal education, maternal marital status, poverty status, Census region, lives in state with childcare entry mandate, lives in state with school entry mandate |

| Author, Year                 | Subgroup | Arm   | Arm Name                        | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference | Adjusted Factors   |
|------------------------------|----------|-------|---------------------------------|---|------|---------------|---------------------------------------|-------------------------|--------------------------|--|
| Casillas, 2017 <sup>27</sup> | NR       | Arm 2 | Yes, ever received WIC benefits | 1 missed opportunity for vaccination for Hepatitis A, defined as visit made to receive another vaccine when child could have received Hepatitis A vaccination           | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not reported            | Comparator: Arm 1        | child sex, child age category, child race/ethnicity, child first born status, maternal age category, maternal education, maternal marital status, poverty status, Census region, lives in state with childcare entry mandate, lives in state with school entry mandate |
| Casillas, 2017 <sup>27</sup> | NR       | Arm 3 | Never heard of WIC/do not know  | 1 missed opportunity for vaccination for Hepatitis A, defined as visit made to receive another vaccine when child could have received Hepatitis A vaccination           | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not reported            | Comparator: Arm 1        | child sex, child age category, child race/ethnicity, child first born status, maternal age category, maternal education, maternal marital status, poverty status, Census region, lives in state with childcare entry mandate, lives in state with school entry mandate |
| Casillas, 2017 <sup>27</sup> | NR       | Arm 1 | No, never received WIC benefits | 2 or more missed opportunities for vaccination for Hepatitis A, defined as visit made to receive another vaccine when child could have received Hepatitis A vaccination | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not reported            | Comparator: Ref          | child sex, child age category, child race/ethnicity, child first born status, maternal age category, maternal education, maternal marital status, poverty status, Census region, lives in state with childcare entry mandate, lives in state with school entry mandate |

| Author, Year                 | Subgroup | Arm   | Arm Name                        | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference | Adjusted Factors   |
|------------------------------|----------|-------|---------------------------------|---|------|---------------|---------------------------------------|-------------------------|--------------------------|--|
| Casillas, 2017 <sup>27</sup> | NR       | Arm 2 | Yes, ever received WIC benefits | 2 or more missed opportunities for vaccination for Hepatitis A, defined as visit made to receive another vaccine when child could have received Hepatitis A vaccination | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not reported            | Comparator: Arm 1        | child sex, child age category, child race/ethnicity, child first born status, maternal age category, maternal education, maternal marital status, poverty status, Census region, lives in state with childcare entry mandate, lives in state with school entry mandate |
| Casillas, 2017 <sup>27</sup> | NR       | Arm 3 | Never heard of WIC/do not know  | 2 or more missed opportunities for vaccination for Hepatitis A, defined as visit made to receive another vaccine when child could have received Hepatitis A vaccination | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not reported            | Comparator: Arm 1        | child sex, child age category, child race/ethnicity, child first born status, maternal age category, maternal education, maternal marital status, poverty status, Census region, lives in state with childcare entry mandate, lives in state with school entry mandate |

CPT= Current Procedural Terminology; DTaP=diphtheria, pertussis, and tetanus vaccine; HepB=hepatitis B vaccine; Hib=Haemophilus influenzae type B vaccine; n=sample size; NA=not available; NR=not reported; p=p-value; PCV=pneumococcal vaccine; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-161. Infant and child healthcare utilization categorical outcomes (preventive care) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name | Outcome Definition   | Tool                         | N at Analysis | Followup Outcome, n(%)                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|----------------------------|-----------|-------|----------|--|------------------------------|---------------|--|-------------------------|--|--|
| Bersak, 2018 <sup>25</sup> | NR        | Arm 1 | WIC      | number of well child visits (WCV) during the first 12 months of life | visits from Medicaid records | 229934        | Followup timepoint: 2004-2012<br>Outcome: 4.210 (2.110) (NR) | NR                      | Comparator: Difference Non-WIC vs WIC #WCV -0.391 (SE 0.01) p=NR               | Child's gender, maternal age dummies, educational attainment, pre-pregnancy smoking status, pre-pregnancy diabetes and hypertension, indicator for previous preterm birth and previous poor birth outcome, vaginal bleeding, gestational hypertension and diabetes, previous cesarean, number of children in the family, family income, dummy variable for plurality, child's birthweight, and year fixed effects. |
| Bersak, 2018 <sup>25</sup> | NR        | Arm 1 | WIC      | probability of one WCV during the first 12 months of life            | visits from Medicaid records | 229934        | Followup timepoint: 2004-2012<br>Outcome: NR (0.938 (0.242)) | NR                      | Comparator: Difference Non-WIC vs WIC Probability 1 WCV -0.031 (SE 0.001) p=NR | Child's gender, maternal age dummies, educational attainment, pre-pregnancy smoking status, pre-pregnancy diabetes and hypertension, indicator for previous preterm birth and previous poor birth outcome, vaginal bleeding, gestational hypertension and diabetes, previous cesarean, number of children in the family, family income, dummy variable for plurality, child's birthweight, and year fixed effects. |

| Author, Year               | Sub-group | Arm   | Arm Name | Outcome Definition   | Tool                         | N at Analysis | Followup Outcome, n(%)                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|----------------------------|-----------|-------|----------|--|------------------------------|---------------|--|-------------------------|--|--|
| Bersak, 2018 <sup>25</sup> | NR        | Arm 1 | WIC      | probability of six WCVs during the first 12 months of life           | visits from Medicaid records | 229934        | Followup timepoint: 2004-2012<br>Outcome: NR (0.153 (0.360)) | NR                      | Comparator: Difference Non-WIC vs WIC<br>Probability 6 WCV<br>-0.03 (SE 0.002)<br>p=NR         | Child's gender, maternal age dummies, educational attainment, pre-pregnancy smoking status, pre-pregnancy diabetes and hypertension, indicator for previous preterm birth and previous poor birth outcome, vaginal bleeding, gestational hypertension and diabetes, previous cesarean, number of children in the family, family income, dummy variable for plurality, child's birthweight, and year fixed effects. |
| Bersak, 2018 <sup>25</sup> | NR        | Arm 2 | Non-WIC  | number of well child visits (WCV) during the first 12 months of life | visits from Medicaid records | 229934        | Followup timepoint: 2004-2012<br>Outcome: 3.819 (2.142) (NR) | NR                      | Comparator: OLS/Maternal FE #WCV<br>Non-WIC vs WIC<br>0.331/0.197 (SE 0.0103/0.0166)<br>p≤0.01 | child's gender, maternal age dummies, educational attainment, pre-pregnancy smoking status, pre-pregnancy diabetes and hypertension, indicator for previous preterm birth and previous poor birth outcome, vaginal bleeding, gestational hypertension and diabetes, previous cesarean, number of children in the family, family income, dummy variable for plurality, child's birthweight, and year fixed effects. |

| Author, Year               | Sub-group | Arm   | Arm Name | Outcome Definition   | Tool                         | N at Analysis | Followup Outcome, n(%)                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|----------------------------|-----------|-------|----------|--|------------------------------|---------------|--|-------------------------|--|--|
| Bersak, 2018 <sup>25</sup> | NR        | Arm 2 | Non-WIC  | probability of one WCV during the first 12 months of life  | visits from Medicaid records | 229934        | Followup timepoint: 2004-2012<br>Outcome: NR (0.906 (0.292)) | NR                      | Comparator: OLS/Maternal FE Probability WCV Non-WIC vs WIC 0.0251/0.0102 (SE 0.00134/0.00239) p≤0.01   | Child's gender, maternal age dummies, educational attainment, pre-pregnancy smoking status, pre-pregnancy diabetes and hypertension, indicator for previous preterm birth and previous poor birth outcome, vaginal bleeding, gestational hypertension and diabetes, previous cesarean, number of children in the family, family income, dummy variable for plurality, child's birthweight, and year fixed effects. |
| Bersak, 2018 <sup>25</sup> | NR        | Arm 2 | Non-WIC  | probability of six WCVs during the first 12 months of life | visits from Medicaid records | 229934        | Followup timepoint: 2004-2012<br>Outcome: NR (0.123 (0.328)) | NR                      | Comparator: OLS/Maternal FE Probability 6 WCV Non-WIC vs WIC 0.0245/0.0159 (SE 0.00162/0.00278) p≤0.01 | Child's gender, maternal age dummies, educational attainment, pre-pregnancy smoking status, pre-pregnancy diabetes and hypertension, indicator for previous preterm birth and previous poor birth outcome, vaginal bleeding, gestational hypertension and diabetes, previous cesarean, number of children in the family, family income, dummy variable for plurality, child's birthweight, and year fixed effects. |

Maternal FE=maternal fixed effects; n=sample size; NA=not available; NR=not reported; OLS=ordinary least squares regression; p=p-value; Ref=reference; SE=standard error; WCV= well-child care visit; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-162. Infant and child anthropometric or growth categorical outcomes (length for age) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition                         | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference    | Between-group Difference           | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|----------------------------|------------------------------------|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm 1 | 0 stressors | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported: -0.137, p=NR | Comparator: Arm 2 vs. Arm 1        | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported: -0.108, p=NR | Comparator: Arm 2 vs. Arm 1 p=0.25 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 1 | 0 stressors | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported: -0.193, p=NR | Comparator: Arm 2 vs. Arm 1        | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition                         | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference     | Between-group Difference              | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|-----------------------------|---------------------------------------|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.151, p=NR | Comparator: Arm 2 vs. Arm 1<br>p=0.54 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.122, p=NR | Comparator: Arm 3 vs. Arm 2           | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 3 | 2 stressors | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.143, p=NR | Comparator: Arm 3 vs. Arm 2<br>p=0.62 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm          | Arm Name                  | Outcome Definition                         | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference     | Between-group Difference              | Adjusted Factors   |
|---------------------------|----------|--------------|---------------------------|--|---|---------------|---------------------------------------|-----------------------------|---------------------------------------|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2        | 1 stressor                | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.15, p=NR  | Comparator: Arm 3 vs. Arm 2           | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3        | 2 stressors               | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.055, p=NR | Comparator: Arm 3 vs. Arm 2<br>p=0.38 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arms 2 and 1 | 1 stressor or 0 stressors | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.127, p=NR | Comparator: Arm 3 vs. Arm 2 or 1      | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm          | Arm Name                  | Outcome Definition                         | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference     | Between-group Difference                   | Adjusted Factors   |
|---------------------------|----------|--------------|---------------------------|--|---|---------------|---------------------------------------|-----------------------------|--|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm 3        | 2 stressors               | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.124, p=NR | Comparator: Arm 3 vs. Arm 2 or 1<br>p=0.93 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arms 2 and 1 | 1 stressor or 0 stressors | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.178, p=NR | Comparator: Arm 3 vs. Arm 2 or 1           | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3        | 2 stressors               | length-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported: - 0.075, p=NR | Comparator: Arm 3 vs. Arm 2 or 1<br>p=0.31 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

CDC=Centers for Disease Control and Prevention; n=sample size; NA=not available; NCHS=National Center for Health Statistics; NR=not reported; p=p-value; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-163. Infant and child anthropometric or growth continuous outcomes (head circumference-for-age z-score) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                   | Sub-group | Arm                        | Arm Name                   | Outcome Definition                 | Tool          | N                            | Followup Outcome                                       | Within-group Difference | Between-group difference  | Adjusted Factors  |
|--------------------------------|-----------|----------------------------|----------------------------|------------------------------------|---------------|------------------------------|--|-------------------------|---|---|
| Lakshmanan, 2020 <sup>36</sup> | NR        | Enrollment in WIC          | Enrollment in WIC          | Head Circumference-for-Age z-score | anthropometry | Baseline: 52<br>Followup: NR | Followup timepoint: NR<br>Baseline: 52<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: -1.53 (SE 0.24)<br>Risk difference: 0.18 (95% CI: -0.97 to 1.33), p=0.76  | Race/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and post discharge diagnosis. |
| Lakshmanan, 2020 <sup>36</sup> | NR        | Not enrolled in WIC        | Not enrolled in WIC        | Head Circumference-for-Age z-score | anthropometry | Baseline: 19<br>Followup: NR | Followup timepoint: NR<br>Baseline: 19<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: -1.65 (NR), p=NR  | Race/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and post discharge diagnosis. |
| Lakshmanan, 2020 <sup>36</sup> | NR        | Enrollment in WIC and SNAP | Enrollment in WIC and SNAP | Head Circumference-for-Age z-score | anthropometry | Baseline: 15<br>Followup: NR | Followup timepoint: NR<br>Baseline: 15<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: -1.56 (SE 0.23)<br>Risk difference: -0.11 (95% CI: -1.44 to 1.22), p=0.87 | Race/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and post discharge diagnosis. |

| Author, Year                   | Sub-group | Arm                          | Arm Name                     | Outcome Definition                 | Tool          | N                            | Followup Outcome                                       | Within-group Difference | Between-group difference   | Adjusted Factors  |
|--------------------------------|-----------|------------------------------|------------------------------|------------------------------------|---------------|------------------------------|--|-------------------------|--|---|
| Lakshmanan, 2020 <sup>36</sup> | NR        | Not enrolled in WIC and SNAP | Not enrolled in WIC and SNAP | Head Circumference-for-Age z-score | anthropometry | Baseline: 37<br>Followup: NR | Followup timepoint: NR<br>Baseline: 37<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: -1.58 (NR), p=NR | Race/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and post discharge diagnosis. |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-164. Infant and child anthropometric or growth continuous outcomes (height for age) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup | Arm   | Arm Name  | Outcome Definition                  | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference    | Adjusted Factors  |
|--------------------------|----------|-------|-----------|-------------------------------------|------|------------------------------|--|-------------------------|-----------------------------|---|
| Guan, 2021 <sup>30</sup> | NR       | Arm 1 | Pre-2009  | Height-for-age z-score at 4-6 years | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref             | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | NR       | Arm 2 | Post-2009 | Height-for-age z-score at 4-6 years | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>p=NS | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-165. Infant and child anthropometric or growth continuous outcomes (length for age) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                   | Sub-group | Arm                        | Arm Name                   | Outcome Definition                    | Tool          | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------------|-----------|----------------------------|----------------------------|---------------------------------------|---------------|------------------------------|--|-------------------------|---|---|
| Lakshmanan, 2020 <sup>36</sup> | NR        | Enrollment in WIC          | Enrollment in WIC          | Length-for-age(Percentile or z-score) | anthropometry | Baseline: 52<br>Followup: NR | Followup timepoint: NR<br>Baseline: 52<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: -2.64 (SE 0.23)<br>Risk difference: 1.02 (95% CI: -0.07 to 2.12 ), p=0.07 | ace/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and postdischarge diagnosis. |
| Lakshmanan, 2020 <sup>36</sup> | NR        | Not enrolled in WIC        | Not enrolled in WIC        | Length-for-age(Percentile or z-score) | anthropometry | Baseline: 19<br>Followup: NR | Followup timepoint: NR<br>Baseline: 19<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: -3.15 (NR), p=NR  | ace/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and postdischarge diagnosis. |
| Lakshmanan, 2020 <sup>36</sup> | NR        | Enrollment in WIC and SNAP | Enrollment in WIC and SNAP | Length-for-age(Percentile or z-score) | anthropometry | Baseline: 15<br>Followup: NR | Followup timepoint: NR<br>Baseline: 15<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: -2.66 (SE 0.22)<br>Risk difference: 1.42 (95% CI: 0.19 to 2.65 ), p=0.03  | ace/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and postdischarge diagnosis. |



| Author, Year                   | Sub-group | Arm                          | Arm Name                     | Outcome Definition                    | Tool          | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------------|-----------|------------------------------|------------------------------|---------------------------------------|---------------|------------------------------|--|-------------------------|--|---|
| Lakshmanan, 2020 <sup>36</sup> | NR        | Not enrolled in WIC and SNAP | Not enrolled in WIC and SNAP | Length-for-age(Percentile or z-score) | anthropometry | Baseline: 37<br>Followup: NR | Followup timepoint: NR<br>Baseline: 37<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: -3.16 (NR), p=NR | ace/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and postdischarge diagnosis.   |
| Guan, 2021 <sup>30</sup>       | NR        | Arm 1                        | Pre-2009                     | Length-for-age z-score at 12 months   | NR            | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup>       | NR        | Arm 2                        | Post-2009                    | Length-for-age z-score at 12 months   | NR            | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>p<0.05                                    | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-166. Infant and child anthropometric or growth continuous outcomes (weight for age) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                   | Arm                          | Arm Name                     | Outcome Definition                             | Tool          | N                            | Followup Outcome                                       | Between-group Difference  | Adjusted Factors  |
|--------------------------------|------------------------------|------------------------------|--|---------------|------------------------------|--|---|---|
| Lakshmanan, 2020 <sup>36</sup> | Enrollment in WIC            | Enrollment in WIC            | Weight-for-Age (Percentile or z-score for age) | anthropometry | Baseline: 52<br>Followup: NR | Followup timepoint: NR<br>Baseline: 52<br>Followup: NR | Comparator: 1<br>Mean difference from baseline: -1.13 (SE 0.18)<br>Risk difference: 1.32 (95% CI: 0.42 to 2.21 ), p=0.005 | ace/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and post discharge diagnosis.  |
| Lakshmanan, 2020 <sup>36</sup> | Not enrolled in WIC          | Not enrolled in WIC          | Weight-for-Age (Percentile or z-score for age) | anthropometry | Baseline: 19<br>Followup: NR | Followup timepoint: NR<br>Baseline: 19<br>Followup: NR | Comparator: 2<br>Mean difference from baseline: -1.91 (NR), p=NR  | ace/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and post discharge diagnosis.  |
| Lakshmanan, 2020 <sup>36</sup> | Enrollment in WIC and SNAP   | Enrollment in WIC and SNAP   | Weight-for-Age (Percentile or z-score for age) | anthropometry | Baseline: 15<br>Followup: NR | Followup timepoint: NR<br>Baseline: 15<br>Followup: NR | Comparator: 1<br>Mean difference from baseline: -1.2 (SE 0.18)<br>Risk difference: 1.19 (95% CI: 0.16 to 2.23 ), p=0.03   | ace/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and post discharge diagnosis.  |
| Lakshmanan, 2020 <sup>36</sup> | Not enrolled in WIC and SNAP | Not enrolled in WIC and SNAP | Weight-for-Age (Percentile or z-score for age) | anthropometry | Baseline: 37<br>Followup: NR | Followup timepoint: NR<br>Baseline: 37<br>Followup: NR | Comparator: 2<br>Mean difference from baseline: -1.78 (NR), p=NR  | ace/ethnicity, maternal education, language, birth weight, neonatal comorbidity, and postdischarge diagnosis.   |
| Guan, 2021 <sup>30</sup>       | Arm 1                        | Pre-2009                     | Weight-for-age z-score at 24 months            | NR            | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | Comparator: Ref   | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

| Author, Year             | Arm   | Arm Name  | Outcome Definition                  | Tool | N                            | Followup Outcome                                       | Between-group Difference    | Adjusted Factors  |
|--------------------------|-------|-----------|-------------------------------------|------|------------------------------|--|-----------------------------|---|
| Guan, 2021 <sup>30</sup> | Arm 2 | Post-2009 | Weight-for-age z-score at 24 months | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | Comparator: 2 vs. 1<br>p=NS | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-167. Infant and child anthropometric or growth continuous outcomes (weight for length) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Subgroup | Arm   | Arm Name  | Outcome Definition                     | N                            | Followup Outcome                                       | Between-group Difference    | Adjusted Factors  |
|--------------------------|----------|-------|-----------|--|------------------------------|--|-----------------------------|---|
| Guan, 2021 <sup>30</sup> | NR       | Arm 1 | Pre-2009  | Weight-for-length z-score at 24 months | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | Comparator: Ref             | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | NR       | Arm 2 | Post-2009 | Weight-for-length z-score at 24 months | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | Comparator: 2 vs. 1<br>p=NS | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-168. Infant and child anthropometric or growth categorical outcomes (weight for length) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Subgroup | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                      | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|----------|-------|-------------------------|--------------------------------------|------|--|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Overall  | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: 1847324<br>Followup: 1847324 | Followup: Year 2000<br>Baseline: NR<br>Followup: 13.4 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Overall  | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: 2018235<br>Followup: 2018235 | Followup: Year 2004<br>Baseline: NR<br>Followup: 14.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Overall  | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 2319712<br>Followup: 2319712 | Followup: Year 2010<br>Baseline: NR<br>Followup: 14.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Overall  | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 2340611<br>Followup: 2340611 | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.3 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Boys     | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR           | Followup: Year 2000<br>Baseline: NR<br>Followup: 14.2 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|----------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Boys     | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 15.4 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Boys     | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 15.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Boys     | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 13.2 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Girls    | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 12.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Girls    | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 13.5 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup       | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|----------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Girls          | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 13.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Girls          | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 11.4 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 3-5 months | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 8.5  | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 3-5 months | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 10.1 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 3-5 months | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 9.9  | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|-----------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Age 3-5 months  | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 8.4  | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 6-11 months | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 10.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 6-11 months | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 12.2 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 6-11 months | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 12.4 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 6-11 months | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 11   | NR                      | NR                       | sex, age, and race-ethnicity |



| Author, Year                 | Subgroup         | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Age 12-17 months | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 14.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 12-17 months | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 15.3 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 12-17 months | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 15   | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 12-17 months | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 18-23 months | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 16.2 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup         | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Age 18-23 months | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 17   | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 18-23 months | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 16.6 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Age 18-23 months | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 14.8 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Hispanic         | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 15.9 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Hispanic         | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 16.6 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|----------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Hispanic | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 17   | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Hispanic | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 13.8 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | White    | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 11.3 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | White    | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 12.4 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | White    | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 12.1 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|----------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | White    | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 11   | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Black    | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 13.3 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Black    | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 14.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Black    | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 13.9 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Black    | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 11.9 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup                      | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|-------------------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Asian/Pacific Islander        | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 9.7  | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Asian/Pacific Islander        | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 10.2 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Asian/Pacific Islander        | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 10.6 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Asian/Pacific Islander        | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 8.5  | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | American Indian/Alaska Native | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 19.4 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup                      | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|-------------------------------|-------|-------------------------|--------------------------------------|------|------------------------------|--|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | American Indian/Alaska Native | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 20.4  | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | American Indian/Alaska Native | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 18.74 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | American Indian/Alaska Native | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 15.6  | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Unknown race/ethnicity        | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 12.5  | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Unknown race/ethnicity        | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 13.2  | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup               | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|------------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Unknown race/ethnicity | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 14   | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Unknown race/ethnicity | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.9 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 0-49% | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 14.1 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 0-49% | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 15   | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 0-49% | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 15.1 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup                | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|-------------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Relative income, 0-49%  | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.8 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 50-99% | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 13.8 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 50-99% | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 15   | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 50-99% | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 14.8 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 50-99% | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.4 | NR                      | NR                       | sex, age, and race-ethnicity |



| Author, Year                 | Subgroup                  | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|---------------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Relative income, 100-150% | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 12.6 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 100-150% | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 13.8 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 100-150% | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 13.6 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, 100-150% | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 11.4 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, >=150%   | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 11.7 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup                | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|-------------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Relative income, >=150% | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 12.7 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, >=150% | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 12.6 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income, >=150% | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 10.7 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income Unknown | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 13.7 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income Unknown | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 14.4 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup                | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|-------------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | Relative income Unknown | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 15.6 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Relative income Unknown | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.9 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | State jurisdiction      | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 13.2 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | State jurisdiction      | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 14.5 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | State jurisdiction      | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 14.4 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year                 | Subgroup               | Arm   | Arm Name                | Outcome Definition                   | Tool | N                            | Followup Outcome                                      | Within-group Difference | Between-group Difference | Adjusted Factors             |
|------------------------------|------------------------|-------|-------------------------|--------------------------------------|------|------------------------------|---|-------------------------|--------------------------|------------------------------|
| Freedman, 2017 <sup>64</sup> | State jurisdiction     | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.3 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Territory jurisdiction | Arm 1 | WIC-PC Survey year 2000 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2000<br>Baseline: NR<br>Followup: 18.3 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Territory jurisdiction | Arm 2 | WIC-PC Survey year 2004 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2004<br>Baseline: NR<br>Followup: 13.6 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Territory jurisdiction | Arm 3 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2010<br>Baseline: NR<br>Followup: 18.4 | NR                      | NR                       | sex, age, and race-ethnicity |
| Freedman, 2017 <sup>64</sup> | Territory jurisdiction | Arm 4 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: NR<br>Followup: NR | Followup: Year 2014<br>Baseline: NR<br>Followup: 10.7 | NR                      | NR                       | sex, age, and race-ethnicity |

| Author, Year            | Subgroup | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                      | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|----------|-------|-------------------------|--------------------------------------|------|--|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Overall  | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 2319712<br>Followup: 2319712 | Followup: Year 2010<br>Baseline: NR<br>Followup: 14.5 (SE 0.02) | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Overall  | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 2277422<br>Followup: 2277422 | Followup: Year 2012<br>Baseline: NR<br>Followup: 13.1 (SE 0.02) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Overall  | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 2340611<br>Followup: 2340611 | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.3 (SE 0.02) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.9 (95% CI: -2.0 to -1.8), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Overall  | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 2345567<br>Followup: 2345567 | Followup: Year 2016<br>Baseline: NR<br>Followup: 12.3 (SE 0.02) | NR                      | NR  | 0                            |

| Author, Year            | Subgroup       | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                      | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|----------------|-------|-------------------------|--------------------------------------|------|--|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Overall        | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 2083443<br>Followup: 2083443 | Followup: Year 2018<br>Baseline: NR<br>Followup: 12.2 (SE 0.02) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.8 (95% CI: -1.9 to -1.8), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Overall        | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 2083443<br>Followup: 2083443 | Followup: Year 2018<br>Baseline: NR<br>Followup: 12.2 (SE 0.02) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0 (95% CI: 0 to 0.1), p=NR        | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 3-5 months | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 189045<br>Followup: 189045   | Followup: Year 2010<br>Baseline: NR<br>Followup: 9.9 (SE 0.07)  | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 3-5 months | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 178192<br>Followup: 178192   | Followup: Year 2012<br>Baseline: NR<br>Followup: 8.6 (SE 0.07)  | NR                      | NR  | 0                            |

| Author, Year            | Subgroup       | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome   | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|----------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|--|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Age 3-5 months | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 187354<br>Followup: 187354 | Followup: Year 2014<br>Baseline: NR<br>Followup: 8.4 (SE 0.06) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.6 (95% CI: -1.8 to -1.4), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 3-5 months | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 210888<br>Followup: 210888 | Followup: Year 2016<br>Baseline: NR<br>Followup: 8.7 (SE 0.06) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Age 3-5 months | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 203908<br>Followup: 203908 | Followup: Year 2018<br>Baseline: NR<br>Followup: 8.2 (SE 0.06) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2 (95% CI: -2.1 to -1.8), p=NR   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 3-5 months | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 203908<br>Followup: 203908 | Followup: Year 2018<br>Baseline: NR<br>Followup: 8.2 (SE 0.06) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: -0.4 (95% CI: -0.5 to -0.2), p=NR | sex, age, and race-ethnicity |

| Author, Year            | Subgroup        | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|-----------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Age 6-11 months | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 525316<br>Followup: 525316 | Followup: Year 2010<br>Baseline: NR<br>Followup: 12.4 (SE 0.05) | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 6-11 months | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 529782<br>Followup: 529782 | Followup: Year 2012<br>Baseline: NR<br>Followup: 11.1 (SE 0.04) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Age 6-11 months | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 620714<br>Followup: 620714 | Followup: Year 2014<br>Baseline: NR<br>Followup: 11 (SE 0.04)   | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.6 (95% CI: -1.7 to -1.5), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 6-11 months | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 640996<br>Followup: 640996 | Followup: Year 2016<br>Baseline: NR<br>Followup: 11.1 (SE 0.04) | NR                      | NR  | 0                            |



| Author, Year            | Subgroup         | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|------------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Age 6-11 months  | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 583767<br>Followup: 583767 | Followup: Year 2018<br>Baseline: NR<br>Followup: 10.9 (SE 0.04) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.5 (95% CI: -1.6 to -1.3), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 6-11 months  | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 583767<br>Followup: 583767 | Followup: Year 2018<br>Baseline: NR<br>Followup: 10.9 (SE 0.04) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0.1 (95% CI: 0 to 0.2), p=NR      | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 12-17 months | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 868676<br>Followup: 868676 | Followup: Year 2010<br>Baseline: NR<br>Followup: 15 (SE 0.04)   | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 12-17 months | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 883792<br>Followup: 883792 | Followup: Year 2012<br>Baseline: NR<br>Followup: 13.5 (SE 0.04) | NR                      | NR  | 0                            |

| Author, Year            | Subgroup         | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|------------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Age 12-17 months | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 988285<br>Followup: 988285 | Followup: Year 2014<br>Baseline: NR<br>Followup: 12.5 (SE 0.03) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2.1 (95% CI: -2.2 to -2.0), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 12-17 months | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 966233<br>Followup: 966233 | Followup: Year 2016<br>Baseline: NR<br>Followup: 12.6 (SE 0.03) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Age 12-17 months | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 838373<br>Followup: 838373 | Followup: Year 2018<br>Baseline: NR<br>Followup: 12.6 (SE 0.04) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2 (95% CI: -2.1 to -1.9), p=NR   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 12-17 months | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 838373<br>Followup: 838373 | Followup: Year 2018<br>Baseline: NR<br>Followup: 12.6 (SE 0.04) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0.1 (95% CI: 0.05 to 0.2), p=NR   | sex, age, and race-ethnicity |

| Author, Year            | Subgroup         | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|------------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Age 18-23 months | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 736675<br>Followup: 736675 | Followup: Year 2010<br>Baseline: NR<br>Followup: 16.6 (SE 0.04) | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 18-23 months | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 685656<br>Followup: 685656 | Followup: Year 2012<br>Baseline: NR<br>Followup: 15.4 (SE 0.04) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Age 18-23 months | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 544258<br>Followup: 544258 | Followup: Year 2014<br>Baseline: NR<br>Followup: 14.8 (SE 0.05) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.9 (95% CI: -2.0 to -1.7), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 18-23 months | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 527450<br>Followup: 527450 | Followup: Year 2016<br>Baseline: NR<br>Followup: 14.8 (SE 0.05) | NR                      | NR  | 0                            |

| Author, Year            | Subgroup         | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                      | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|------------------|-------|-------------------------|--------------------------------------|------|--|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Age 18-23 months | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 457395<br>Followup: 457395   | Followup: Year 2018<br>Baseline: NR<br>Followup: 14.9 (SE 0.05) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.8 (95% CI: -1.9 to -1.7), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Age 18-23 months | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 457395<br>Followup: 457395   | Followup: Year 2018<br>Baseline: NR<br>Followup: 14.9 (SE 0.05) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0.1 (95% CI: 0 to 0.1), p=NR      | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Boys             | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 1176994<br>Followup: 1176994 | Followup: Year 2010<br>Baseline: NR<br>Followup: 15.5 (SE 0.03) | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Boys             | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 1158070<br>Followup: 1158070 | Followup: Year 2012<br>Baseline: NR<br>Followup: 14.1 (SE 0.03) | NR                      | NR  | 0                            |

| Author, Year            | Subgroup | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                      | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|----------|-------|-------------------------|--------------------------------------|------|--|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Boys     | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 1190132<br>Followup: 1190132 | Followup: Year 2014<br>Baseline: NR<br>Followup: 13.2 (SE 0.03) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2 (95% CI: -2.1 to -1.9), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Boys     | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 1192499<br>Followup: 1192499 | Followup: Year 2016<br>Baseline: NR<br>Followup: 13.2 (SE 0.03) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Boys     | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 1062371<br>Followup: 1062371 | Followup: Year 2018<br>Baseline: NR<br>Followup: 13.1 (SE 0.03) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2 (95% CI: -2.1 to -1.9), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Boys     | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 1062371<br>Followup: 1062371 | Followup: Year 2018<br>Baseline: NR<br>Followup: 13.1 (SE 0.03) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0 (95% CI: -0.1 to 0.1), p=NR   | sex, age, and race-ethnicity |

| Author, Year            | Subgroup | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                      | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|----------|-------|-------------------------|--------------------------------------|------|--|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Girls    | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 1142718<br>Followup: 1142718 | Followup: Year 2010<br>Baseline: NR<br>Followup: 13.5 (SE 0.03) | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Girls    | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 1119352<br>Followup: 1119352 | Followup: Year 2012<br>Baseline: NR<br>Followup: 12.2 (SE 0.03) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Girls    | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 1150479<br>Followup: 1150479 | Followup: Year 2014<br>Baseline: NR<br>Followup: 11.4 (SE 0.03) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.8 (95% CI: -1.8 to -1.7), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Girls    | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 1153068<br>Followup: 1153068 | Followup: Year 2016<br>Baseline: NR<br>Followup: 11.4 (SE 0.03) | NR                      | NR  | 0                            |

| Author, Year            | Subgroup            | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                      | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|---------------------|-------|-------------------------|--------------------------------------|------|--|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Girls               | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 1021072<br>Followup: 1021072 | Followup: Year 2018<br>Baseline: NR<br>Followup: 11.3 (SE 0.03) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.7 (95% CI: -1.8 to -1.6), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Girls               | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 1021072<br>Followup: 1021072 | Followup: Year 2018<br>Baseline: NR<br>Followup: 11.3 (SE 0.03) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0.1 (95% CI: 0 to 0.1), p=NR      | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | White, non-Hispanic | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 748889<br>Followup: 748889   | Followup: Year 2010<br>Baseline: NR<br>Followup: 12.1 (SE 0.04) | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | White, non-Hispanic | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 719133<br>Followup: 719133   | Followup: Year 2012<br>Baseline: NR<br>Followup: 11.2 (SE 0.04) | NR                      | NR  | 0                            |

| Author, Year            | Subgroup            | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|---------------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | White, non-Hispanic | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 730586<br>Followup: 730586 | Followup: Year 2014<br>Baseline: NR<br>Followup: 11 (SE 0.04)   | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -0.9 (95% CI: -1.0 to -0.8), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | White, non-Hispanic | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 702650<br>Followup: 702650 | Followup: Year 2016<br>Baseline: NR<br>Followup: 11.2 (SE 0.04) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | White, non-Hispanic | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 616781<br>Followup: 616781 | Followup: Year 2018<br>Baseline: NR<br>Followup: 11 (SE 0.04)   | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -0.8 (95% CI: -0.9 to -0.6), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | White, non-Hispanic | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 616781<br>Followup: 616781 | Followup: Year 2018<br>Baseline: NR<br>Followup: 11 (SE 0.04)   | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0.1 (95% CI: 0 to 0.2), p=NR      | sex, age, and race-ethnicity |



| Author, Year            | Subgroup            | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|---------------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Black, non-Hispanic | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 464419<br>Followup: 464419 | Followup: Year 2010<br>Baseline: NR<br>Followup: 13.9 (SE 0.05) | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Black, non-Hispanic | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 469092<br>Followup: 469092 | Followup: Year 2012<br>Baseline: NR<br>Followup: 12.7 (SE 0.05) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Black, non-Hispanic | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 503362<br>Followup: 503362 | Followup: Year 2014<br>Baseline: NR<br>Followup: 11.9 (SE 0.05) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.7 (95% CI: -1.8 to -1.6), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Black, non-Hispanic | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 523183<br>Followup: 523183 | Followup: Year 2016<br>Baseline: NR<br>Followup: 11.9 (SE 0.04) | NR                      | NR  | 0                            |

| Author, Year            | Subgroup            | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome  | Within-group Difference | Between-group Difference   | Adjusted Factors             |
|-------------------------|---------------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|---|-------------------------|--|------------------------------|
| Pan, 2021 <sup>75</sup> | Black, non-Hispanic | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 485675<br>Followup: 485675 | Followup: Year 2018<br>Baseline: NR<br>Followup: 11.7 (SE 0.05) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.8 (95% CI: -2 to -1.7), p=NR  | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Black, non-Hispanic | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 485675<br>Followup: 485675 | Followup: Year 2018<br>Baseline: NR<br>Followup: 11.7 (SE 0.05) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: -0.1 (95% CI: -0.3 to 0.0), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Hispanic            | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 970555<br>Followup: 970555 | Followup: Year 2010<br>Baseline: NR<br>Followup: 17 (SE 0.04)   | NR                      | Comparator: Ref  | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Hispanic            | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 948891<br>Followup: 948891 | Followup: Year 2012<br>Baseline: NR<br>Followup: 15.1 (SE 0.04) | NR                      | NR   | 0                            |

| Author, Year            | Subgroup | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|----------|-------|-------------------------|--------------------------------------|------|--------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Hispanic | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 968864<br>Followup: 968864 | Followup: Year 2014<br>Baseline: NR<br>Followup: 13.8 (SE 0.04) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2.8 (95% CI: -2.9 to -2.7), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Hispanic | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 982069<br>Followup: 982069 | Followup: Year 2016<br>Baseline: NR<br>Followup: 13.6 (SE 0.03) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Hispanic | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 853982<br>Followup: 853982 | Followup: Year 2018<br>Baseline: NR<br>Followup: 13.7 (SE 0.04) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2.7 (95% CI: -2.8 to -2.6), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Hispanic | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 853982<br>Followup: 853982 | Followup: Year 2018<br>Baseline: NR<br>Followup: 13.7 (SE 0.04) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0.1 (95% CI: 0.0 to 0.2), p=NR    | sex, age, and race-ethnicity |

| Author, Year            | Subgroup                      | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                  | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|-------------------------------|-------|-------------------------|--------------------------------------|------|------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | American Indian/Alaska Native | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 27183<br>Followup: 27183 | Followup: Year 2010<br>Baseline: NR<br>Followup: 18.7 (SE 0.24) | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | American Indian/Alaska Native | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 28308<br>Followup: 28308 | Followup: Year 2012<br>Baseline: NR<br>Followup: 17.5 (SE 0.23) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | American Indian/Alaska Native | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 29030<br>Followup: 29030 | Followup: Year 2014<br>Baseline: NR<br>Followup: 15.6 (SE 0.21) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2.6 (95% CI: -3.3 to -2.0), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | American Indian/Alaska Native | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 28741<br>Followup: 28741 | Followup: Year 2016<br>Baseline: NR<br>Followup: 16.6 (SE 0.22) | NR                      | NR  | 0                            |

| Author, Year            | Subgroup                      | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                  | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|-------------------------------|-------|-------------------------|--------------------------------------|------|------------------------------------|---|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | American Indian/Alaska Native | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 26407<br>Followup: 26407 | Followup: Year 2018<br>Baseline: NR<br>Followup: 16.1 (SE 0.23) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.9 (95% CI: -2.5 to -1.3), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | American Indian/Alaska Native | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 26407<br>Followup: 26407 | Followup: Year 2018<br>Baseline: NR<br>Followup: 16.1 (SE 0.23) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0.7 (95% CI: 0.1 to 1.3), p=NR    | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Asian/Pacific Islander        | Arm 1 | WIC-PC Survey year 2010 | Prevalence of High Weight-for-Length | NR   | Baseline: 88591<br>Followup: 88591 | Followup: Year 2010<br>Baseline: NR<br>Followup: 10.6 (SE 0.1)  | NR                      | Comparator: Ref   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Asian/Pacific Islander        | Arm 2 | WIC-PC Survey year 2012 | Prevalence of High Weight-for-Length | NR   | Baseline: 94925<br>Followup: 94925 | Followup: Year 2012<br>Baseline: NR<br>Followup: 9.5 (SE 0.1)   | NR                      | NR  | 0                            |

| Author, Year            | Subgroup               | Arm   | Arm Name                | Outcome Definition                   | Tool | N                                    | Followup Outcome   | Within-group Difference | Between-group Difference  | Adjusted Factors             |
|-------------------------|------------------------|-------|-------------------------|--------------------------------------|------|--------------------------------------|--|-------------------------|---|------------------------------|
| Pan, 2021 <sup>75</sup> | Asian/Pacific Islander | Arm 3 | WIC-PC Survey year 2014 | Prevalence of High Weight-for-Length | NR   | Baseline: 105288<br>Followup: 105288 | Followup: Year 2014<br>Baseline: NR<br>Followup: 8.5 (SE 0.09) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -2 (95% CI: -2.2 to -1.7), p=NR   | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Asian/Pacific Islander | Arm 4 | WIC-PC Survey year 2016 | Prevalence of High Weight-for-Length | NR   | Baseline: 107581<br>Followup: 107581 | Followup: Year 2016<br>Baseline: NR<br>Followup: 8.6 (SE 0.09) | NR                      | NR  | 0                            |
| Pan, 2021 <sup>75</sup> | Asian/Pacific Islander | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 99708<br>Followup: 99708   | Followup: Year 2018<br>Baseline: NR<br>Followup: 8.5 (SE 0.09) | NR                      | Comparator: Arm 1: year 2010<br>Adjusted prevalence difference: -1.9 (95% CI: -2.2 to -1.6), p=NR | sex, age, and race-ethnicity |
| Pan, 2021 <sup>75</sup> | Asian/Pacific Islander | Arm 5 | WIC-PC Survey year 2018 | Prevalence of High Weight-for-Length | NR   | Baseline: 99708<br>Followup: 99708   | Followup: Year 2018<br>Baseline: NR<br>Followup: 8.5 (SE 0.09) | NR                      | Comparator: Arm 3: year 2014<br>Adjusted prevalence difference: 0.1 (95% CI: -0.2 to 0.3), p=NR   | sex, age, and race-ethnicity |

CI=confidence interval; WIC-PC=WIC Participant and Program Characteristics; N=sample size; NR=not reported; p=p-value; SD=standard deviation; Ref=reference;  
WIC=Special Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-169. Infant and child anthropometric or growth continuous outcomes (weight for height) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Subgroup                    | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference | Adjusted Factors  |
|------------------------------|-----------------------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|--------------------------|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 years   | Arm 1 | 0 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref          | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 years | Arm 1 | 0 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref          | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 year    | Arm 1 | 0 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref          | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 years | Arm 1 | 0 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref          | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 years   | Arm 1 | 0 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref          | child's initial WHZ, maternal education, maternal language preference, household income |



| Author, Year                 | Subgroup                    | Arm   | Arm Name                                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------------------|-------|---|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 years   | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 years   | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 5 years   | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 years   | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.06 (SE 0.03), p=NR   | See Ref group   |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 years | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.08 (SE 0.03), p<0.05 | See Ref group   |

| Author, Year                 | Subgroup                    | Arm   | Arm Name                                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors |
|------------------------------|-----------------------------|-------|---|--------------------|------|------------------------------|--|-------------------------|---|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 year    | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.04 (SE 0.03), p=NR    | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 years | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.03 (SE 0.03), p=NR   | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 years   | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.09 (SE 0.03), p<0.001 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 years   | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.06 (SE 0.02), p<0.01  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 years   | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.02), p=NR    | See Ref group    |

| Author, Year                 | Subgroup                      | Arm   | Arm Name                                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------------------------|-------|---|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 5 years     | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.03 (SE 0.04), p=NR | See Ref group   |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0 years   | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0.5 years | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1 year    | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1.5 years | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                   | Arm   | Arm Name                                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|----------------------------|-------|---|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2020 <sup>59</sup> | gender: female;age 2 years | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 3 years | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 4 years | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 5 years | Arm 1 | 0 years receiving new food package        | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 0 years | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.03), p=NR | See Ref group   |

| Author, Year                 | Subgroup                      | Arm   | Arm Name                                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors |
|------------------------------|-------------------------------|-------|---|--------------------|------|------------------------------|--|-------------------------|---|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0.5 years | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.05 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1 year    | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.03 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1.5 years | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.08 (SE 0.03), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 2 years   | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0 (SE 0.03), p=NR     | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 3 years   | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.03 (SE 0.02), p=NR  | See Ref group    |

| Author, Year                 | Subgroup                    | Arm   | Arm Name                                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors |
|------------------------------|-----------------------------|-------|---|--------------------|------|------------------------------|--|-------------------------|--|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 4 years | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0 (SE 0.02), p=NR      | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 5 years | Arm 2 | >0 and <1 year receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.05 (SE 0.04), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 years   | Arm 3 | 1 to <2 years receiving new food package  | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.09 (SE 0.03), p<0.01 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 years | Arm 3 | 1 to <2 years receiving new food package  | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.09 (SE 0.03), p<0.01 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 year    | Arm 3 | 1 to <2 years receiving new food package  | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.04 (SE 0.03), p=NR   | See Ref group    |

| Author, Year                 | Subgroup                    | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors |
|------------------------------|-----------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|--|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 years | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.03), p=NR   | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 years   | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.07 (SE 0.03), p<0.01 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 years   | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.03 (SE 0.02), p=NR   | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 years   | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.03 (SE 0.02), p=NR   | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 5 years   | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0 (SE 0.04), p=NR      | See Ref group    |

| Author, Year                 | Subgroup                     | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors |
|------------------------------|------------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|--|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: female;age 0 years   | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.04 (SE 0.04), p<0.01 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 0.5 years | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.03), p<0.01 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1 year    | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.01 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1.5 years | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.02 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 2 years   | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.03), p<0.01 | See Ref group    |



| Author, Year                 | Subgroup                    | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors |
|------------------------------|-----------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|--|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 3 years | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.01 (SE 0.02), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 4 years | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.03 (SE 0.02), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 5 years | Arm 3 | 1 to <2 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.06 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 years   | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.07 (SE 0.03), p<0.05 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 years | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.09 (SE 0.03), p<0.01 | See Ref group    |

| Author, Year                 | Subgroup                    | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors |
|------------------------------|-----------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|---|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 year    | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.04 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 years | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.04 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 years   | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.01 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 years   | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.04 (SE 0.02), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 years   | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.04 (SE 0.02), p=NR | See Ref group    |

| Author, Year                 | Subgroup                      | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors |
|------------------------------|-------------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|---|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 5 years     | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.02 (SE 0.02), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0 years   | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.01 (SE 0.03), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0.5 years | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.09 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1 year    | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1.5 years | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.04 (SE 0.03), p=NR | See Ref group    |

| Author, Year                 | Subgroup                    | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors |
|------------------------------|-----------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|---|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 2 years | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.02 (SE 0.03), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 3 years | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0 (SE 0.02), p=NR     | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 4 years | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.02 (SE 0.02), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 5 years | Arm 4 | 2 to <3 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.04 (SE 0.03), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 years   | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.03), p=NR  | See Ref group    |

| Author, Year                 | Subgroup                    | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors |
|------------------------------|-----------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|---|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 years | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.13 (SE 0.03), p<0.001 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 year    | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.11 (SE 0.03), p<0.001 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 years | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.01 (SE 0.03), p=NR   | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 years   | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.09 (SE 0.03), p=NR    | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 years   | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.01 (SE 0.02), p=NR    | See Ref group    |

| Author, Year                 | Subgroup                      | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors |
|------------------------------|-------------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|---|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 years     | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0 (SE 0.02), p=NR     | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 5 years     | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.02 (SE 0.03), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0 years   | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.03 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0.5 years | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.12 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1 year    | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.08 (SE 0.03), p=NR  | See Ref group    |

| Author, Year                 | Subgroup                     | Arm   | Arm Name                                 | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors |
|------------------------------|------------------------------|-------|--|--------------------|------|------------------------------|--|-------------------------|---|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1.5 years | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.05 (SE 0.03), p=NR | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 2 years   | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.03), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 3 years   | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.02 (SE 0.02), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 4 years   | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0.01 (SE 0.02), p=NR  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 5 years   | Arm 5 | 3 to <4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.03 (SE 0.03), p=NR | See Ref group    |

| Author, Year                 | Subgroup                    | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors |
|------------------------------|-----------------------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 years   | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.05 (SE 0.03), p=NR    | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 years | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.01 (SE 0.02), p=NR    | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 year    | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.04 (SE 0.02), p=NR    | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 years | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.08 (SE 0.02), p<0.001 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 years   | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.02 (SE 0.02), p=NR    | See Ref group    |



| Author, Year                 | Subgroup                      | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors |
|------------------------------|-------------------------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 years     | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.06 (SE 0.02), p<0.001 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 years     | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.09 (SE 0.02), p<0.001 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 5 years     | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.1 (SE 0.03), p<0.001  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0 years   | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.06 (SE 0.03), p<0.05  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0.5 years | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: 0 (SE 0.02), p=NR        | See Ref group    |

| Author, Year                 | Subgroup                     | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors |
|------------------------------|------------------------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|------------------|
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1 year    | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.08 (SE 0.02), p<0.001 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1.5 years | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.09 (SE 0.02), p<0.001 | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 2 years   | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.04 (SE 0.02), p<0.05  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 3 years   | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.06 (SE 0.02), p<0.01  | See Ref group    |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 4 years   | Arm 6 | 4 years receiving new food package | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.08 (SE 0.02), p<0.001 | See Ref group    |

| Author, Year                 | Subgroup                    | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-----------------------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 5 years | Arm 6 | 4 years receiving new food package   | mean WHZ z-score   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in mean scores: -0.07 (SE 0.03), p<0.05 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0                 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH<br>Difference: -0.06 (SE 0.06), p=NS        | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0                 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH<br>Difference: 0 (SE 0.06), p=NS            | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0                 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup      | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|---------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH<br>Difference: 0.01 (SE 0.06), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH<br>Difference: 0.03 (SE 0.06), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH<br>Difference: 0.07 (SE 0.06), p=NS | See Ref group  |

| Author, Year                 | Subgroup      | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                     | Adjusted Factors   |
|------------------------------|---------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.08 (SE 0.06), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.05 (SE 0.06), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.07 (SE 0.06), p=NS | See Ref group  |

| Author, Year                 | Subgroup      | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors   |
|------------------------------|---------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: -0.01 (SE 0.06), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.08 (SE 0.06), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup    | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors   |
|------------------------------|-------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.09 (SE 0.05), p=NS   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.1 (SE 0.05), p≤0.05  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.11 (SE 0.05), p≤0.05 | See Ref group  |

| Author, Year                 | Subgroup    | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                     | Adjusted Factors   |
|------------------------------|-------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.07 (SE 0.05), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.08 (SE 0.08), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.08 (SE 0.08), p=NS | See Ref group  |



| Author, Year                 | Subgroup     | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                     | Adjusted Factors   |
|------------------------------|--------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5  | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.08 (SE 0.06), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.06 (SE 0.06), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup       | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors   |
|------------------------------|----------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: -0.09 (SE 0.05), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: -0.06 (SE 0.05), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.15 (SE 0.06), p≤0.05 | See Ref group  |

| Author, Year                 | Subgroup       | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                     | Adjusted Factors   |
|------------------------------|----------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.06 (SE 0.06), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.08 (SE 0.05), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.06 (SE 0.06), p=NS | See Ref group  |

| Author, Year                 | Subgroup       | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors   |
|------------------------------|----------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0 (SE 0.05), p=NS     | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: -0.02 (SE 0.05), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup     | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|--------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH<br>Difference: 0.04 (SE 0.05), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH<br>Difference: -0.01 (SE 0.05), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH<br>Difference: 0.02 (SE 0.05), p=NS  | See Ref group  |

| Author, Year                 | Subgroup     | Arm   | Arm Name                             | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                     | Adjusted Factors   |
|------------------------------|--------------|-------|--------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.02 (SE 0.05), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 3 | Fully breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 1 | Fully breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.1 (SE 0.08), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 2 | Fully breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Mean WH Difference: 0.1 (SE 0.07), p=NS  | See Ref group  |

| Author, Year                 | Subgroup     | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors   |
|------------------------------|--------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 3 | Fully breastfeed, new package only    | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0  | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: -0.01 (SE 0.04), p=NS | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0  | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 1.1 (SE 0.04), p=NS   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup      | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors   |
|------------------------------|---------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0   | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: -0.04 (SE 0.03), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: -0.04 (SE 0.03), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |



| Author, Year                 | Subgroup      | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|---------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.08 (SE 0.04), p≤0.05  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.14 (SE 0.04), p=NS    | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.29 (SE 0.03), p≤0.001 | See Ref group  |

| Author, Year                 | Subgroup      | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|---------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.24 (SE 0.03), p=NS    | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.16 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.15 (SE 0.03), p=NS    | See Ref group  |

| Author, Year                 | Subgroup    | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors   |
|------------------------------|-------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.2 (SE 0.03), p<0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.17 (SE 0.03), p=NS   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup    | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.13 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.11 (SE 0.03), p=NS    | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.2 (SE 0.05), p≤0.001  | See Ref group  |

| Author, Year                 | Subgroup     | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors   |
|------------------------------|--------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5  | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.18 (SE 0.05), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5  | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.01 (SE 0.04), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: -0.01 (SE 0.04), p=NS | See Ref group  |

| Author, Year                 | Subgroup       | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0   | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: -0.06 (SE 0.03), p≤0.05 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: -0.03 (SE 0.03), p=NS   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup       | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|----------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH<br>Difference: 0.1 (SE 0.04), p≤0.01   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH<br>Difference: 0.09 (SE 0.04), p≤0.01  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH<br>Difference: 0.24 (SE 0.03), p≤0.001 | See Ref group  |

| Author, Year                 | Subgroup       | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|----------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.18 (SE 0.03), $p \leq 0.001$ | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.15 (SE 0.03), $p \leq 0.001$ | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.13 (SE 0.03), $p \leq 0.001$ | See Ref group  |



| Author, Year                 | Subgroup     | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|--------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.12 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.11 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup     | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|--------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH<br>Difference: 0.12 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH<br>Difference: 0.11 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 4 | Mostly breastfeed, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH<br>Difference: 0.04 (SE 0.04), p=NS    | See Ref group  |

| Author, Year                 | Subgroup     | Arm   | Arm Name                              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors   |
|------------------------------|--------------|-------|---------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 5 | Mostly breastfeed, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm6<br>Mean WH Difference: 0.07 (SE 0.04), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 6 | Mostly breastfeed, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0  | Arm 7 | Mostly Formula, old package only      | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: -0.01 (SE 0.04), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0  | Arm 8 | Mostly Formula, mixed package only    | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: -0.03 (SE 0), p=NS    | See Ref group  |

| Author, Year                 | Subgroup      | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors   |
|------------------------------|---------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0   | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: -0.02 (SE 0.02), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: 0.01 (SE 0.02), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup      | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|---------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.12 (SE 0.03), $p \leq 0.001$ | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.08 (SE 0.03), $p \leq 0.01$  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.11 (SE 0.02), $p \leq 0.001$ | See Ref group  |

| Author, Year                 | Subgroup      | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|---------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.06 (SE 0.02), p≤0.01 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.07 (SE 0.02), p≤0.01 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.07 (SE 0.02), p≤0.01 | See Ref group  |

| Author, Year                 | Subgroup    | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|-------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.09 (SE 0.02), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.05 (SE 0.02), p≤0.05  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup    | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|-------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.08 (SE 0.02), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.05 (SE 0.02), p≤0.05  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.1 (SE 0.03), p≤0.01   | See Ref group  |



| Author, Year                 | Subgroup     | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors   |
|------------------------------|--------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5  | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: 0.07 (SE 0.03), p≤0.05 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5  | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: 0 (SE 0.03), p=NS      | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: -0.05 (SE 0.03), p=NS  | See Ref group  |

| Author, Year                 | Subgroup       | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors   |
|------------------------------|----------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0   | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: -0.03 (SE 0.02), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: 0.01 (SE 0.02), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup       | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.13 (SE 0.03), $p \leq 0.001$ | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.11 (SE 0.03), $p \leq 0.001$ | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.13 (SE 0.02), $p \leq 0.001$ | See Ref group  |

| Author, Year                 | Subgroup       | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.1 (SE 0.02), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.07 (SE 0.02), p≤0.01 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.03 (SE 0.02), p=NS   | See Ref group  |

| Author, Year                 | Subgroup     | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|--------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.04 (SE 0.02), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.04 (SE 0.02), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup     | Arm   | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|--------------|-------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.06 (SE 0.02), p≤0.01 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 8 | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.05 (SE 0.02), p≤0.05 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 9 | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 7 | Mostly Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH<br>Difference: 0.02 (SE 0.03), p=NS   | See Ref group  |

| Author, Year                 | Subgroup     | Arm    | Arm Name                           | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors   |
|------------------------------|--------------|--------|------------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 8  | Mostly Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm9<br>Mean WH Difference: 0.05 (SE 0.03), p=NS   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 9  | Mostly Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0  | Arm 10 | Fully Formula, old package only    | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: -0.02 (SE 0.03), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0  | Arm 11 | Fully Formula, mixed package only  | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0 (SE 0.03), p=NS     | See Ref group  |

| Author, Year                 | Subgroup      | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors   |
|------------------------------|---------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0   | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: -0.02 (SE 0.03), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: -0.01 (SE 0.03), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 0.5 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |



| Author, Year                 | Subgroup      | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|---------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.12 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.1 (SE 0.03), p≤0.01   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1   | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.11 (SE 0.03), p≤0.001 | See Ref group  |

| Author, Year                 | Subgroup      | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|---------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.07 (SE 0.03), p≤0.05 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 1.5 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.05 (SE 0.03), p=NS   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2   | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.07 (SE 0.03), p≤0.05 | See Ref group  |

| Author, Year                 | Subgroup    | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|-------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 2 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.1 (SE 0.03), p<0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.05 (SE 0.02), p=NS   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 3 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup    | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.09 (SE 0.02), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.06 (SE 0.02), p≤0.05  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 4 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.09 (SE 0.02), p≤0.05  | See Ref group  |

| Author, Year                 | Subgroup     | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors   |
|------------------------------|--------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5  | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.07 (SE 0.04), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Boys, Age 5  | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.01 (SE 0.03), p=NS  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: -0.02 (SE 0.03), p=NS | See Ref group  |

| Author, Year                 | Subgroup       | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors   |
|------------------------------|----------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|--|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0   | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: -0.04 (SE 0.03), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: -0.02 (SE 0.03), p=NS | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 0.5 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup       | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.13 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.15 (SE 0.03), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1   | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.07 (SE 0.03), p≤0.05  | See Ref group  |

| Author, Year                 | Subgroup       | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.04 (SE 0.03), p=NS   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 1.5 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.08 (SE 0.03), p≤0.01 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2   | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.05 (SE 0.03), p=NS   | See Ref group  |



| Author, Year                 | Subgroup     | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|--------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 2 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.06 (SE 0.02), p<0.01 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.03 (SE 0.02), p=NS   | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 3 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |

| Author, Year                 | Subgroup     | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|--------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|---|--|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.1 (SE 0.02), p≤0.001  | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.09 (SE 0.02), p≤0.001 | See Ref group  |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 4 | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5 | Arm 10 | Fully Formula, old package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH<br>Difference: 0.09 (SE 0.04), p≤0.05  | See Ref group  |

| Author, Year                 | Subgroup         | Arm    | Arm Name                          | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors  |
|------------------------------|------------------|--------|-----------------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5     | Arm 11 | Fully Formula, mixed package only | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm12<br>Mean WH Difference: 0.03 (SE 0.04), p=NS | See Ref group   |
| Chaparro, 2020 <sup>60</sup> | Girls, Age 5     | Arm 12 | Fully Formula, new package only   | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Matched for child age at first weight and height measurement, sex, race or ethnicity, and initial WHZ; maternal education and language preference (English, Spanish, other); and family poverty status                                      |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 0-0.5 | Arm 1  | Full dose (old package)           | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup         | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|------------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 0-0.5 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: 0.081 (SE 0.044), p=0.068   | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 0.5-1 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 0.5-1 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: -0.413 (SE 0.031), p≤0.0001 | See Ref group   |

| Author, Year                 | Subgroup       | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 1-2 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 1-2 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: 0.063 (SE 0.015), p≤0.0001 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup       | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: -0.021 (SE 0.012), p=0.075 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: 0.015 (SE 0.011), p=0.181  | See Ref group   |

| Author, Year                 | Subgroup          | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5    | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5    | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: -0.043 (SE 0.019), p=0.027 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 0-0.5 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup          | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 0-0.5 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: 0.103 (SE 0.044), p=0.019  | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 0.5-1 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 0.5-1 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: -0.439 (SE 0.03), p≤0.0001 | See Ref group.  |



| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 1-2 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 1-2 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: 0.056 (SE 0.015), p≤0.001 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: 0.04 (SE 0.012), p≤0.001   | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: -0.021 (SE 0.011), p=0.055 | See Ref group   |

| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 1 | Full dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Slope difference: 0.009 (SE 0.019), p=0.636 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3  | Arm 3 | Late dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup       | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: -0.021 (SE 0.06), p=0.728 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 3 | Late dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: -0.089 (SE 0.038), p=0.02 | See Ref group   |

| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference                                       | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5  | Arm 3 | Late dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5  | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: 0.04 (SE 0.051), p=0.439 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 3 | Late dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: 0.024 (SE 0.059), p=0.686  | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 3 | Late dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: -0.027 (SE 0.036), p=0.455 | See Ref group   |

| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 3 | Late dose (old package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: -0.051 (SE 0.048), p=0.295 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3  | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup       | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: 0.017 (SE 0.06), p=0.785  | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: 0.056 (SE 0.043), p=0.193 | See Ref group   |



| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5  | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5  | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: -0.029 (SE 0.076), p=0.706 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: 0.023 (SE 0.717),<br>p=0.717 | See Ref group   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: -0.03 (SE 0.46),<br>p=0.46   | See Ref group   |

| Author, Year                 | Subgroup        | Arm   | Arm Name                | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 4 | Late dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 2 | Full dose (new package) | WHZ                | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: 0.083 (SE 0.249), p=0.249 | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1     | Arm 1 | Low WHZ (old package)   | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup    | Arm   | Arm Name              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-------------|-------|-----------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.17 (99% CI: -0.24 to 0.10), $p \leq 0.01$ | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 1 | Low WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.11 (99% CI: -0.18 to 0.05), $p \leq 0.01$ | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-------------|-------|-----------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 1 | Low WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.13 (99% CI: -0.19 to 0.06), $p \leq 0.01$ | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 1 | Low WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup    | Arm   | Arm Name              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|-----------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.11 (99% CI: -0.18 to 0.05), p≤0.01 | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5 | Arm 1 | Low WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.08 (99% CI: -0.19 to 0.02), p=NS   | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|---------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.21 (99% CI: -0.25 to 0.16), p≤0.01 | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup    | Arm   | Arm Name                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-------------|-------|---------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.13 (99% CI: -0.17 to 0.08), $p \leq 0.01$ | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.13 (99% CI: -0.17 to 0.09), $p \leq 0.01$ | See Ref group   |



| Author, Year                 | Subgroup    | Arm   | Arm Name                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|---------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.11 (99% CI: -0.15 to 0.07), p≤0.01 | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup    | Arm   | Arm Name                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-------------|-------|---------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.14 (99% CI: -0.21 to 0.08), $p \leq 0.01$ | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 1 | High WHZ (old package)    | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 2 | High WHZ (new package)    | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.15 (99% CI: -0.22 to 0.07), $p \leq 0.01$ | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name               | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 1 | High WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 2 | High WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.04 (99% CI: -0.11 to 0.03), p=NS | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 1 | High WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup    | Arm   | Arm Name               | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 2 | High WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.06 (99% CI: -0.13 to 0.00), p=NS | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 1 | High WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 2 | High WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.06 (99% CI: -0.13 to 0.00), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5  | Arm 1 | High WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5  | Arm 2 | High WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.1 (99% CI: -0.19 to 0.01), p<0.01 | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 1 | Low WHZ (old package)  | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup     | Arm   | Arm Name              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|--------------|-------|-----------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.19 (99% CI: -0.26 to 0.11), $p \leq 0.01$ | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 1 | Low WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.12 (99% CI: -0.20 to 0.04), $p \leq 0.01$ | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|--------------|-------|-----------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 1 | Low WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.1 (99% CI: -0.17 to 0.04), p≤0.01 | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 1 | Low WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup     | Arm   | Arm Name              | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|--------------|-------|-----------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.13 (99% CI: -0.19 to 0.06), $p \leq 0.01$ | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 1 | Low WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 2 | Low WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.11 (99% CI: -0.21 to 0.01), $p \leq 0.01$ | See Ref group   |



| Author, Year                 | Subgroup     | Arm   | Arm Name                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|--------------|-------|---------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.2 (99% CI: -0.25 to 0.16), p≤0.01 | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup     | Arm   | Arm Name                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|--------------|-------|---------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.15 (99% CI: -0.20 to 0.10), $p \leq 0.01$ | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.1 (99% CI: -0.14 to 0.06), $p \leq 0.01$  | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|---------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.12 (99% CI: -0.16 to 0.07), p≤0.01 | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 1 | Average WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup     | Arm   | Arm Name                  | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|--------------|-------|---------------------------|--------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 2 | Average WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.09 (99% CI: -0.15 to 0.03), $p \leq 0.01$ | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 1 | High WHZ (old package)    | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 2 | High WHZ (new package)    | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.15 (99% CI: -0.22 to 0.08), $p \leq 0.01$ | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 1 | High WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 2 | High WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.06 (99% CI: -0.13 to 0.01), p=NS | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 1 | High WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |

| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 2 | High WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: 0.01 (99% CI: -0.05 to 0.07), p=NS  | See Ref group   |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 1 | High WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 2 | High WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.01 (99% CI: -0.07 to 0.05), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 1 | High WHZ (old package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 2 | High WHZ (new package) | WHZ, Main effects  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Mean difference: -0.01 (99% CI: -0.10 to 0.08), p=NS | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.04<br>(99% CI: -0.05 to 0.12), p=NS | See Ref group   |



| Author, Year                 | Subgroup    | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.01<br>(99% CI: -0.07 to 0.10), p=NS | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0 (99% CI: -0.08 to 0.08), p=NS | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0 (99% CI: -0.08 to 0.08), p=NS | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.06<br>(99% CI: -0.06 to 0.18), p=NS | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 1 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.06<br>(99% CI: -0.03 to 0.15), p=NS | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 2 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.09 (99% CI: 0.00 to 0.17), p≤0.01 | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 3 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.06 (99% CI: -0.01 to 0.14), p=NS | See Ref group   |

| Author, Year                 | Subgroup    | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 4 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.05<br>(99% CI: -0.03 to 0.13), p=NS | See Ref group   |



| Author, Year                 | Subgroup    | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Boys, Age 5 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.04<br>(99% CI: -0.07 to 0.15), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.01<br>(99% CI: -0.07 to 0.10), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.03<br>(99% CI: -0.06 to 0.12), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0 (99% CI: -0.08 to 0.07), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: -0.01 (99% CI: -0.09 to 0.06), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name              | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|-----------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 1 | Low WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 2 | Low WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: -0.02 (99% CI: -0.13 to 0.10), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 1 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.06 (99% CI: -0.03 to 0.14), p=NS | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 2 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.09 (99% CI: 0.01 to 0.18), p≤0.01 | See Ref group   |



| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 3 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.11 (99% CI: 0.03 to 0.18), p≤0.01 | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 4 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.11 (99% CI: 0.03 to 0.18), p≤0.01 | See Ref group   |

| Author, Year                 | Subgroup     | Arm   | Arm Name               | Outcome Definition       | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|--------------|-------|------------------------|--------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 1 | High WHZ (old package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. an interaction between WHZ strata and food package exposure group was included to assess modification of the effect of the WIC package by initial weight status |
| Chaparro, 2019 <sup>58</sup> | Girls, Age 5 | Arm 2 | High WHZ (new package) | WHZ, Interaction effects | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparator<br>Average WHZ arm for same subgroup<br>Difference: 0.08<br>(99% CI: -0.02 to 0.19), p=NS | See Ref group   |

n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SE=standard error; WH=weight for height; WHZ= weight-for-length/height z-score; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-170. Infant and child anthropometric or growth continuous outcomes (growth velocity) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Subgroup                         | Arm     | Arm Name                           | Outcome Definition  | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference | Adjusted Factors  |
|------------------------------|----------------------------------|---------|------------------------------------|---|------|------------------------------|--|-------------------------|--------------------------|---|
| Anderson, 2020 <sup>52</sup> | gender: male                     | Overall | Overall                            | Weight for height z score trajectory from birth to 4 years of age | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: NR           | Child race/ethnicity, maternal education, maternal language preference, family income, year of birth, year of birth squared |
| Anderson, 2020 <sup>52</sup> | gender: female                   | Overall | Overall                            | Weight for height z score trajectory from birth to 4 years of age | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: NR           | Child race/ethnicity, maternal education, maternal language preference, family income, year of birth, year of birth squared |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 to 0.5 years | Arm 1   | 0 years receiving new food package | Slope of Weight for Height change                                 | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref          | child's initial WHZ, maternal education, maternal language preference, household income                                     |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 to 1 years | Arm 1   | 0 years receiving new food package | Slope of Weight for Height change                                 | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref          | child's initial WHZ, maternal education, maternal language preference, household income                                     |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 to 1.5 years | Arm 1   | 0 years receiving new food package | Slope of Weight for Height change                                 | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref          | child's initial WHZ, maternal education, maternal language preference, household income                                     |

| Author, Year                 | Subgroup                         | Arm   | Arm Name                                  | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------------------------|-------|---|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 to 2 years | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 to 3 years   | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 to 4 years   | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 to 5 years   | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 to 0.5 years | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.04 (SE 0.1), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                         | Arm   | Arm Name                                  | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------------------------|-------|---|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 to 1 years | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.07 (SE 0.09), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 to 1.5 years | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.14 (SE 0.08), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 to 2 years | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.23 (SE 0.06), p<0.001 | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 to 3 years   | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.02), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 to 4 years   | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.05 (SE 0.02), p<0.05 | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                           | Arm   | Arm Name                                  | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|------------------------------------|-------|---|-----------------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 to 5 years     | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.01 (SE 0.04), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0 to 0.5 years | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0.5 to 1 years | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1 to 1.5 years | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1.5 to 2 years | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                          | Arm   | Arm Name                                  | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-----------------------------------|-------|---|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: female;age 2 to 3 years   | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 3 to 4 years   | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 4 to 5 years   | Arm 1 | 0 years receiving new food package        | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 0 to 0.5 years | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.06 (SE 0.1), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 0.5 to 1 years | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.05 (SE 0.09), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |



| Author, Year                 | Subgroup                          | Arm   | Arm Name                                  | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-----------------------------------|-------|---|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1 to 1.5 years | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.22 (SE 0.08), p<0.01 | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1.5 to 2 years | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.18 (SE 0.06), p<0.01  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 2 to 3 years   | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.02 (SE 0.02), p=NR    | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 3 to 4 years   | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.03 (SE 0.02), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 4 to 5 years   | Arm 2 | >0 and <1 year receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.05 (SE 0.04), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                         | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 to 0.5 years | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.01 (SE 0.1), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 to 1 years | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.1 (SE 0.09), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 to 1.5 years | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.03 (SE 0.08), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 to 2 years | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.09 (SE 0.06), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 to 3 years   | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.04 (SE 0.02), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                           | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|------------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 to 4 years     | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0 (SE 0.02), p=NR     | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 to 5 years     | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.04), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0 to 0.5 years | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.05 (SE 0.1), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0.5 to 1 years | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.05 (SE 0.09), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1 to 1.5 years | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.08), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                           | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|------------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1.5 to 2 years | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.07 (SE 0.06), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 2 to 3 years   | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.03 (SE 0.02), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 3 to 4 years   | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.02), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 4 to 5 years   | Arm 3 | 1 to <2 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.03 (SE 0.04), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 to 0.5 years   | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.05 (SE 0.1), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                         | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 to 1 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.11 (SE 0.09), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 to 1.5 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0 (SE 0.08), p=NR     | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 to 2 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.06 (SE 0.06), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 to 3 years   | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.04 (SE 0.02), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 to 4 years   | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0 (SE 0.02), p=NR     | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                           | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|------------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 to 5 years     | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.01 (SE 0.04), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0 to 0.5 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.2 (SE 0.1), p=NR    | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0.5 to 1 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.14 (SE 0.09), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1 to 1.5 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.12 (SE 0.08), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 1.5 to 2 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.04 (SE 0.06), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                         | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|----------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 2 to 3 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.02 (SE 0.02), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 3 to 4 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.02), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 4 to 5 years | Arm 4 | 2 to <3 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.04), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 to 0.5 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.23 (SE 0.09), p<0.05 | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 to 1 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.05 (SE 0.08), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                         | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|----------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 to 1.5 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.24 (SE 0.08), p<0.01  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 to 2 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.21 (SE 0.06), p<0.001  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 to 3 years   | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.09 (SE 0.02), p<0.001 | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 to 4 years   | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.01 (SE 0.02), p=NR    | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 to 5 years   | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.01 (SE 0.04), p=NR    | child's initial WHZ, maternal education, maternal language preference, household income |



| Author, Year                 | Subgroup                          | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2020 <sup>59</sup> | gender: female;age 0 to 0.5 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.17 (SE 0.09), p=NR     | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 0.5 to 1 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.08 (SE 0.08), p=NR    | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1 to 1.5 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.25 (SE 0.07), p<0.001 | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1.5 to 2 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.14 (SE 0.06), p<0.05   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 2 to 3 years   | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0 (SE 0.02), p=NR        | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                         | Arm   | Arm Name                                 | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------------------------|-------|--|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 3 to 4 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.01 (SE 0.02), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 4 to 5 years | Arm 5 | 3 to <4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.04 (SE 0.04), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0 to 0.5 years | Arm 6 | 4 years receiving new food package       | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.07 (SE 0.08), p=NR  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 0.5 to 1 years | Arm 6 | 4 years receiving new food package       | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.06 (SE 0.07), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1 to 1.5 years | Arm 6 | 4 years receiving new food package       | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.08 (SE 0.06), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                           | Arm   | Arm Name                           | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|------------------------------------|-------|------------------------------------|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: male; age 1.5 to 2 years   | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.12 (SE 0.05), p<0.05  | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 2 to 3 years     | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.05 (SE 0.02), p<0.01 | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 3 to 4 years     | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.02), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: male; age 4 to 5 years     | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.01 (SE 0.03), p=NR   | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female; age 0 to 0.5 years | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.12 (SE 0.08), p=NR    | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                          | Arm   | Arm Name                           | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-----------------------------------|-------|------------------------------------|-----------------------------------|------|------------------------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>59</sup> | gender: female;age 0.5 to 1 years | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.16 (SE 0.07), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1 to 1.5 years | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.06), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 1.5 to 2 years | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.1 (SE 0.05), p<0.05 | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 2 to 3 years   | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.02), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |
| Chaparro, 2020 <sup>59</sup> | gender: female;age 3 to 4 years   | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: -0.02 (SE 0.02), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |

| Author, Year                 | Subgroup                         | Arm   | Arm Name                           | Outcome Definition                | Tool | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|----------------------------------|-------|------------------------------------|-----------------------------------|------|------------------------------|--|-------------------------|--|---|
| Chaparro, 2020 <sup>59</sup> | gender: female; age 4 to 5 years | Arm 6 | 4 years receiving new food package | Slope of Weight for Height change | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Difference in slope from comparator arm: 0.01 (SE 0.03), p=NR | child's initial WHZ, maternal education, maternal language preference, household income |

n=sample size; NA=not available; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SE=standard error; WH=weight for height; WHZ= weight-for-length/height z-score; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-171. Infant and child weight categorical outcomes (BMIz obese) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                  | Subgroup | Arm   | Arm Name                                       | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|----------|-------|--|---|------|---------------|------------------------|-------------------------|---|---|
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 1 | Very low income (<50% FPL), boys, old package  | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 5433          | 5433 (100)             | NR                      | Comparator: Ref (for Arm 2)   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 2 | Very low income (<50% FPL), boys, new package  | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 5433          | 5433 (100)             | NR                      | Comparator: Arm 1<br>RR: 0.85 (95% CI: 0.79,0.92),<br>p=Interaction P: looking at interaction between family income strata and WIC package to determine if association between package and obesity risk at 4 years varied by income= 0.72 | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 3 | Very low income (<50% FPL), girls, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 5294          | 5294 (100)             | NR                      | Comparator: Ref for Arm 4   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 4 | Very low income (<50%                          | Obesity at age 4 years (BMI for age   | NR   | 5294          | 5294 (100)             | NR                      | Comparator: Arm 3   | Samples matched on child's sex, race/ethnicity,   |

| Author, Year                  | Subgroup | Arm   | Arm Name                                     | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|----------|-------|--|---|------|---------------|------------------------|-------------------------|---|---|
|                               |          |       | FPL), girls, new package                     | >95th percentile in sex-specific growth curves from CDC                                     |      |               |                        |                         | RR: 0.88 (95% CI: 0.81,0.96), p=Interaction P: looking at interaction between family income strata and WIC package to determine if association between package and obesity risk at 4 years varied by income= 0.28 | maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics   |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 5 | Low income (50-100% FPL), boys, old package  | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 10520         | 10520 (100)            | NR                      | Comparator: Ref for Arm 6   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 6 | Low income (50-100% FPL), boys, new package  | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 10520         | 10520 (100)            | NR                      | Comparator: Arm 5<br>RR: 0.87 (95% CI: 0.82,0.91), p=REF for interaction P  | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 7 | Low income (50-100% FPL), girls, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 10206         | 10206 (100)            | NR                      | Comparator: Ref for Arm 8   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting   |

| Author, Year                  | Subgroup | Arm    | Arm Name  | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|----------|--------|---|---|------|---------------|------------------------|-------------------------|--|---|
|                               |          |        |   |   |      |               |                        |                         |  | by family size and neighborhood characteristics   |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 8  | Low income (50-100% FPL), girls, new package          | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 10206         | 10206 (100)            | NR                      | Comparator: Arm 7<br>RR: 0.93 (95% CI: 0.88,0.99), p=REF for interaction P   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 9  | Above poverty (>100% to <185% FPL), boys, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 4177          | 4177 (100)             | NR                      | Comparator: Ref for Arm 10   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | NR       | Arm 10 | Above poverty (>100% to <185% FPL), boys, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 4177          | 4177 (100)             | NR                      | Comparator: Arm 9<br>RR: 0.82 (95% CI: 0.76,0.88), p=Interaction P: looking at interaction between family income strata and WIC package to determine if association between package and obesity risk at 4 years varied by income= 0.16 | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |



| Author, Year                  | Subgroup                            | Arm    | Arm Name   | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-------------------------------------|--------|--|---|------|---------------|------------------------|-------------------------|--|---|
| Chaparro , 2020 <sup>61</sup> | NR                                  | Arm 11 | Above poverty (>100% to <185% FPL), girls, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 4121          | 4121 (100)             | NR                      | Comparator: Ref for Arm 12   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | NR                                  | Arm 12 | Above poverty (>100% to <185% FPL), girls, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | 4121          | 4121 (100)             | NR                      | Comparator: Arm 11<br>RR: 0.88 (95% CI: 0.81,0.95),<br>p=Interaction P: looking at interaction between family income strata and WIC package to determine if association between package and obesity risk at 4 years varied by income= 0.22 | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 1  | Very low income (<50% FPL), boys, old package          | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 2  | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | Neighborhood poverty                | Arm 2  | Very low income (<50% FPL), boys, new package          | Obesity at age 4 years (BMI for age >95th percentile in                                     | NR   | NR            | NR                     | NR                      | Comparator: Arm 1<br>RR: 0.91 (95%   | Samples matched on child's sex, race/ethnicity, maternal education, language preference,  |

| Author, Year                 | Subgroup                            | Arm    | Arm Name  | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference                                | Adjusted Factors  |
|------------------------------|-------------------------------------|--------|---|--|------|---------------|------------------------|-------------------------|---|---|
|                              | prevalence 10%                      |        |   | sex-specific growth curves from CDC  |      |               |                        |                         | CI: 0.80,1.03), p=NR                                    | family income; interaction P calculated by adjusting by family size and neighborhood characteristics  |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 5  | Low income (50-100% FPL), boys, old package           | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 6                               | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 6  | Low income (50-100% FPL), boys, new package           | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Arm 5<br>RR: 0.91 (95% CI: 0.83,0.99), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 9  | Above poverty (>100% to <185% FPL), boys, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 10                              | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 10 | Above poverty (>100% to <185% FPL), boys, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Arm 9<br>RR: 0.84 (95% CI: 0.75,0.94), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and                              |

| Author, Year                 | Subgroup                            | Arm    | Arm Name                                       | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference                                | Adjusted Factors  |
|------------------------------|-------------------------------------|--------|--|--|------|---------------|------------------------|-------------------------|---|---|
|                              |                                     |        |  |  |      |               |                        |                         |   | neighborhood characteristics  |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 3  | Very low income (<50% FPL), girls, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 4                               | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 4  | Very low income (<50% FPL), girls, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Arm 3<br>RR: 0.92 (95% CI: 0.80,1.06), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 7  | Low income (50-100% FPL), girls, old package   | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 8                               | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 8  | Low income (50-100% FPL), girls, new package   | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Arm 7<br>RR: 0.94 (95% CI: 0.86,1.04), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood                        | Arm 11 | Above poverty (>100% to                        | Obesity at age 4 years (BMI for age  | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 12                              | Samples matched on child's sex, race/ethnicity,   |

| Author, Year                 | Subgroup                            | Arm    | Arm Name   | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference                                 | Adjusted Factors  |
|------------------------------|-------------------------------------|--------|--|--|------|---------------|------------------------|-------------------------|--|---|
|                              | poverty prevalence 10%              |        | <185% FPL), girls, old package                         | >95th percentile in sex-specific growth curves from CDC                                      |      |               |                        |                         |  | maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics   |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 10% | Arm 12 | Above poverty (>100% to <185% FPL), girls, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Arm 11<br>RR: 0.88 (95% CI: 0.78,0.99), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 1  | Very low income (<50% FPL), boys, old package          | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 2                                | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 2  | Very low income (<50% FPL), boys, new package          | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Arm 1<br>RR: 0.84 (95% CI: 0.78,0.91), p=NR  | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 5  | Low income (50-100% FPL), boys, old package            | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 6                                | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting   |

| Author, Year                  | Subgroup                            | Arm    | Arm Name  | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference                                | Adjusted Factors  |
|-------------------------------|-------------------------------------|--------|---|---|------|---------------|------------------------|-------------------------|---|---|
|                               |                                     |        |   |   |      |               |                        |                         |   | by family size and neighborhood characteristics   |
| Chaparro , 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 6  | Low income (50-100% FPL), boys, new package           | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Arm 5<br>RR: 0.85 (95% CI: 0.81,0.90), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 9  | Above poverty (>100% to <185% FPL), boys, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 10                              | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 10 | Above poverty (>100% to <185% FPL), boys, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Arm 9<br>RR: 0.81 (95% CI: 0.74,0.88), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro , 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 3  | Very low income (<50% FPL), girls, old package        | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 4                               | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |

| Author, Year                 | Subgroup                            | Arm    | Arm Name   | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference                                | Adjusted Factors  |
|------------------------------|-------------------------------------|--------|--|---|------|---------------|------------------------|-------------------------|---|---|
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 4  | Very low income (<50% FPL), girls, new package         | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Arm 3<br>RR: 0.88 (95% CI: 0.80,0.96), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 7  | Low income (50-100% FPL), girls, old package           | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 8                               | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 8  | Low income (50-100% FPL), girls, new package           | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Arm 7<br>RR: 0.93 (95% CI: 0.87,0.99), p=NR | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 30% | Arm 11 | Above poverty (>100% to <185% FPL), girls, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 12                              | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty                | Arm 12 | Above poverty (>100% to <185% FPL),                    | Obesity at age 4 years (BMI for age >95th percentile in                                     | NR   | NR            | NR                     | NR                      | Comparator: Arm 11<br>RR: 0.88 (95%                     | Samples matched on child's sex, race/ethnicity, maternal education, language preference,  |

| Author, Year                 | Subgroup                            | Arm   | Arm Name                                      | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-------------------------------------|-------|---|--|------|---------------|------------------------|-------------------------|---|---|
|                              | prevalence 30%                      |       | girls, new package                            | sex-specific growth curves from CDC  |      |               |                        |                         | CI: 0.80,0.97), p=NR  | family income; interaction P calculated by adjusting by family size and neighborhood characteristics  |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 1 | Very low income (<50% FPL), boys, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 2   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 2 | Very low income (<50% FPL), boys, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Arm 1<br>RR: 0.78 (95% CI: 0.66,0.92), p=P value for comparison of interactions between WIC package and neighborhood poverty between family income stratum (ref 50-100% FPL)=0.83 | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 5 | Low income (50-100% FPL), boys, old package   | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 6   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty                | Arm 6 | Low income (50-100% FPL),                     | Obesity at age 4 years (BMI for age >95th percentile in                                      | NR   | NR            | NR                     | NR                      | Comparator: Arm 5   | Samples matched on child's sex, race/ethnicity, maternal education,   |

| Author, Year                 | Subgroup                            | Arm    | Arm Name  | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-------------------------------------|--------|---|---|------|---------------|------------------------|-------------------------|---|---|
|                              | prevalence 50%                      |        | boys, new package                                     | sex-specific growth curves from CDC   |      |               |                        |                         | RR: 0.8 (95% CI: 0.71,0.90), p=NR   | language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics   |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 9  | Above poverty (>100% to <185% FPL), boys, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 10  | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 10 | Above poverty (>100% to <185% FPL), boys, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Arm 9<br>RR: 0.77 (95% CI: 0.64,0.93), p=P value for comparison of interactions between WIC package and neighborhood poverty between family income stratum (ref 50-100% FPL)=0.81 | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 3  | Very low income (<50% FPL), girls, old package        | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 4   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood                        | Arm 4  | Very low income (<50%                                 | Obesity at age 4 years (BMI for age   | NR   | NR            | NR                     | NR                      | Comparator: Arm 3   | Samples matched on child's sex, race/ethnicity,   |



| Author, Year                 | Subgroup                            | Arm    | Arm Name   | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%) | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-------------------------------------|--------|--|---|------|---------------|------------------------|-------------------------|--|---|
|                              | poverty prevalence 50%              |        | FPL), girls, new package                               | >95th percentile in sex-specific growth curves from CDC                                     |      |               |                        |                         | RR: 0.83 (95% CI: 0.69,1.00), p=P value for comparison of interactions between WIC package and neighborhood poverty between family income stratum (ref 50-100% FPL)=0.67 | maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics   |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 7  | Low income (50-100% FPL), girls, old package           | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 8  | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 8  | Low income (50-100% FPL), girls, new package           | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Arm 7<br>RR: 0.92 (95% CI: 0.80,1.05), p=NR  | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 11 | Above poverty (>100% to <185% FPL), girls, old package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC | NR   | NR            | NR                     | NR                      | Comparator: Ref for Arm 12   | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |

| Author, Year                 | Subgroup                            | Arm    | Arm Name   | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                     | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-------------------------------------|--------|--|--|------|---------------|--|-------------------------|---|---|
| Chaparro, 2020 <sup>61</sup> | Neighborhood poverty prevalence 50% | Arm 12 | Above poverty (>100% to <185% FPL), girls, new package | Obesity at age 4 years (BMI for age >95th percentile in sex-specific growth curves from CDC) | NR   | NR            | NR   | NR                      | Comparator: Arm 11<br>RR: 0.88 (95% CI: 0.72,1.09),<br>p=P value for comparison of interactions between WIC package and neighborhood poverty between family income stratum (ref 50-100% FPL)=0.87 | Samples matched on child's sex, race/ethnicity, maternal education, language preference, family income; interaction P calculated by adjusting by family size and neighborhood characteristics |
| Chaparro, 2020 <sup>59</sup> | gender: male                        | Arm 1  | 0 years receiving new food package                     | sex specific BMI ≥95th percentile for age (CDC curves)                                       | NR   | 11089         | Followup timepoint: 4 years of age<br>Outcome: 11089 (100) | NR                      | Comparator: Ref   | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income   |
| Chaparro, 2020 <sup>59</sup> | gender: male                        | Arm 2  | >0 and <1 year receiving new food package              | sex specific BMI ≥95th percentile for age (CDC curves)                                       | NR   | 4361          | Followup timepoint: 4 years of age<br>Outcome: 4361 (100)  | NR                      | Comparator: Arm 1<br>obesity prevalence: 26.9<br>RR: 1.05 (95% CI: 0.99-1.12),<br>p=NR  | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income   |
| Chaparro, 2020 <sup>59</sup> | gender: male                        | Arm 3  | 1 to <2 years receiving new food package               | sex specific BMI ≥95th percentile for age (CDC curves)                                       | NR   | 4138          | Followup timepoint: 4 years of age<br>Outcome: 4138 (100)  | NR                      | Comparator: Arm 1<br>obesity prevalence: 26.7<br>RR: 1.02 (95% CI: 0.96-1.09),<br>p=NR  | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income   |
| Chaparro, 2020 <sup>59</sup> | gender: male                        | Arm 4  | 2 to <3 years receiving new food package               | sex specific BMI ≥95th percentile for age (CDC curves)                                       | NR   | 4436          | Followup timepoint: 4 years of age<br>Outcome:             | NR                      | Comparator: Arm 1<br>obesity prevalence: 25.8<br>RR: 1 (95% CI:   | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income   |

| Author, Year                  | Subgroup       | Arm   | Arm Name                                  | Outcome Definition                                     | Tool | N at Analysis | Followup Outcome, n(%)                                     | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|----------------|-------|---|--|------|---------------|--|-------------------------|---|---|
|                               |                |       |   |  |      |               | 4436 (100)   |                         | 0.95-1.07), p=NR  |   |
| Chaparro , 2020 <sup>59</sup> | gender: male   | Arm 5 | 4 to <4 years receiving new food package  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 4679          | Followup timepoint: 4 years of age<br>Outcome: 4679 (100)  | NR                      | Comparator: Arm 1<br>obesity prevalence: 25.1<br>RR: 0.98 (95% CI: 0.92-1.04), p=NR   | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro , 2020 <sup>59</sup> | gender: male   | Arm 6 | 4 to <4 years receiving new food package  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 9706          | Followup timepoint: 4 years of age<br>Outcome: 9706 (100)  | NR                      | Comparator: Arm 1<br>obesity prevalence: 23.1<br>RR: 0.93 (95% CI: 0.89-0.98), p<0.05 | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro , 2020 <sup>59</sup> | gender: female | Arm 1 | 0 years receiving new food package        | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 10552         | Followup timepoint: 4 years of age<br>Outcome: 10552 (100) | NR                      | Comparator: Ref   | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro , 2020 <sup>59</sup> | gender: female | Arm 2 | >0 and <1 year receiving new food package | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 4167          | Followup timepoint: 4 years of age<br>Outcome: 4167 (100)  | NR                      | Comparator: Arm 1<br>obesity prevalence: 22.7<br>RR: 1 (95% CI: 0.94-1.07), p=NR      | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro , 2020 <sup>59</sup> | gender: female | Arm 3 | 1 to <2 years receiving new food package  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 3979          | Followup timepoint: 4 years of age<br>Outcome: 3979 (100)  | NR                      | Comparator: Arm 1<br>obesity prevalence: 22.9<br>RR: 0.98 (95% CI: 0.92-1.05), p=NR   | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro , 2020 <sup>59</sup> | gender: female | Arm 4 | 2 to <3 years receiving new food package  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 4262          | Followup timepoint: 4 years of                             | NR                      | Comparator: Arm 1<br>obesity  | child race/ethnicity; initial WHZ; age; maternal education, maternal                                    |

| Author, Year                 | Subgroup       | Arm     | Arm Name                                 | Outcome Definition                                     | Tool | N at Analysis | Followup Outcome, n(%)                                     | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------|---------|--|--|------|---------------|--|-------------------------|---|---|
|                              |                |         |  |  |      |               | age Outcome: 4262 (100)                                    |                         | prevalence: 22.7<br>RR: 0.99 (95% CI: 0.92-1.05),<br>p=NR                                     | language preference, family income  |
| Chaparro, 2020 <sup>59</sup> | gender: female | Arm 5   | 4 to <4 years receiving new food package | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 4508          | Followup timepoint: 4 years of age<br>Outcome: 4508 (100)  | NR                      | Comparator: Arm 1<br>obesity prevalence: 22.3<br>RR: 0.93 (95% CI: 0.89-1.02),<br>p=NR        | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro, 2020 <sup>59</sup> | gender: female | Arm 6   | 4 to <4 years receiving new food package | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 8997          | Followup timepoint: 4 years of age<br>Outcome: 8997 (100)  | NR                      | Comparator: Arm 1<br>obesity prevalence: 20.9<br>RR: 0.94 (95% CI: 0.89-0.99),<br>p<0.05      | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro, 2020 <sup>59</sup> | gender: male   | Overall | Overall                                  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 38409         | Followup timepoint: 4 years of age<br>Outcome: 38409 (100) | NR                      | Comparator: Overall<br>obesity prevalence: NR<br>RR: 0.98 (95% CI: 0.98-0.99),<br>p<0.05      | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro, 2020 <sup>59</sup> | gender: female | Overall | Overall                                  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | 36465         | Followup timepoint: 4 years of age<br>Outcome: 36465 (100) | NR                      | Comparator: Overall<br>obesity prevalence: NR<br>RR: 0.99 (95% CI: 0.98-1.00),<br>p<0.05      | child race/ethnicity; initial WHZ; age; maternal education, maternal language preference, family income |
| Chaparro, 2020 <sup>59</sup> | gender: male   | Overall | Overall                                  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR          | NR                      | Comparator: Subset who received old infant package<br>obesity prevalence: NR<br>RR: 1.04 (95% | NR  |

| Author, Year                 | Subgroup       | Arm     | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|------------------------------|----------------|---------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
|                              |                |         |                             |  |      |               |   |                         | CI: 0.98-1.12), p=NR   |                               |
| Chaparro, 2020 <sup>59</sup> | gender: female | Overall | Overall                     | sex specific BMI ≥95th percentile for age (CDC curves)   | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Subset who received old infant package obesity prevalence: NR<br>RR: 1 (95% CI: 0.93-1.08), p=NR | NR                            |
| Pan, 2016 <sup>73, 74</sup>  | NR             | Arm 1   | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age ≥the 95th percentile on the CDC growth charts) | NR   | 2352648       | Followup timepoint: NR<br>Outcome: NR (14)        | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup>  | NR             | Arm 2   | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age ≥the 95th percentile on the CDC growth charts) | NR   | 2648564       | Followup timepoint: NR<br>Outcome: NR (15.5)      | NR                      | Comparator: Arm1<br>Percent Difference: 1.2 (95% CI: (1.2 to 1.3)), p=Significant                            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup>  | NR             | Arm 3   | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age ≥the 95th percentile on the CDC growth charts) | NR   | 3307442       | Followup timepoint: NR<br>Outcome: NR (15.9)      | NR                      | Comparator: Arm2<br>Percent Difference: 0.1 (95% CI: (0.1 to 0.2)), p=Significant                            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup>  | NR             | Arm 5   | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age ≥the 95th percentile on the CDC growth charts) | NR   | 3016487       | Followup timepoint: NR<br>Outcome: NR (14.5)      | NR                      | Comparator: Arm3<br>Percent Difference: -1.3 (95% CI: (-1.4 to -1.3)), p=Significant                         | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup>  | Alabama        | Arm 1   | 2000 Child WIC Participants | Prevalence of obese (sex-specific  | NR   | 28680         | Followup timepoint:                               | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |          |       |                             | body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts)                                   |      |               | NR<br>Outcome: NR (13.2)                     |                         |  |                               |
| Pan, 2016 <sup>73, 74</sup> | Alabama  | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 39859         | Followup timepoint: NR<br>Outcome: NR (14.1) | NR                      | Comparator: Arm1<br>Percent Difference: 0.5 (95% CI: (0.0 to 1.0)), p=NS         | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Alabama  | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 45743         | Followup timepoint: NR<br>Outcome: NR (15.8) | NR                      | Comparator: Arm2<br>Percent Difference: 0.7 (95% CI: 0.2 to 1.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Alabama  | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 43509         | Followup timepoint: NR<br>Outcome: NR (16.3) | NR                      | Comparator: Arm3<br>Percent Difference: 0.3 (95% CI: -0.2 to 0.8), p=NS          | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Alaska   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7879          | Followup timepoint: NR<br>Outcome: NR (18.8) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Alaska   | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 9297          | Followup timepoint: NR<br>Outcome: NR (20.6) | NR                      | Comparator: Arm1<br>Percent Difference: 1.9 (95% CI: 0.7 to 3.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Alaska   | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 10108         | Followup timepoint: NR                       | NR                      | Comparator: Arm2<br>Percent Difference: 0.1                                      | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |          |       |                             | percentile on the CDC growth charts)   |      |               | Outcome: NR (21.2)                           |                         | (95% CI: -1.0 to 1.2)), p=NS   |                               |
| Pan, 2016 <sup>73, 74</sup> | Alaska   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5552          | Followup timepoint: NR<br>Outcome: NR (19.1) | NR                      | Comparator: Arm3<br>Percent Difference: -1.7 (95% CI: (-2.9 to -0.4)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Arizona  | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 37898         | Followup timepoint: NR<br>Outcome: NR (11.3) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Arizona  | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 50484         | Followup timepoint: NR<br>Outcome: NR (12.1) | NR                      | Comparator: Arm1<br>Percent Difference: 0.7 (95% CI: 0.3 to 1.2)), p=Significant     | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Arizona  | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 72933         | Followup timepoint: NR<br>Outcome: NR (15)   | NR                      | Comparator: Arm2<br>Percent Difference: 2.7 (95% CI: 2.3 to 3.1)), p=Significant     | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Arizona  | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 53044         | Followup timepoint: NR<br>Outcome: NR (13.3) | NR                      | Comparator: Arm3<br>Percent Difference: -1.7 (95% CI: (-2.1 to -1.3)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Arkansas | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 22085         | Followup timepoint: NR                       | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup   | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|------------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |            |       |                             | percentile on the CDC growth charts)   |      |               | Outcome: NR (11)                             |                         |   |                               |
| Pan, 2016 <sup>73, 74</sup> | Arkansas   | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 24713         | Followup timepoint: NR<br>Outcome: NR (12.5) | NR                      | Comparator: Arm1<br>Percent Difference: 1.2 (95% CI: 0.6 to 1.8)), p=Significant  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Arkansas   | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 31245         | Followup timepoint: NR<br>Outcome: NR (14.8) | NR                      | Comparator: Arm2<br>Percent Difference: 1.8 (95% CI: (1.2 to 2.4)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Arkansas   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 28543         | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm3<br>Percent Difference: -0.4 (95% CI: (-1.0 to 0.1)), p=NS        | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | California | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 449965        | Followup timepoint: NR<br>Outcome: NR (16.4) | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | California | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 482239        | Followup timepoint: NR<br>Outcome: NR (16.4) | NR                      | Comparator: Arm1<br>Percent Difference: 0 (95% CI: (-0.2 to 0.1)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | California | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 583008        | Followup timepoint: NR<br>Outcome: NR (18.4) | NR                      | Comparator: Arm2<br>Percent Difference: 1.7 (95% CI: (1.6 to                      | Age, sex, and race/ethnicity. |



| Author, Year                | Subgroup    | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|-------------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |             |       |                             |  |      |               |  |                         | 1.9)),<br>p=Significant   |                               |
| Pan, 2016 <sup>73, 74</sup> | California  | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 551510        | Followup timepoint: NR<br>Outcome: NR (16.6) | NR                      | Comparator: Arm3<br>Percent Difference: -1.7 (95% CI: (-1.8 to -1.6)),<br>p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Colorado    | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 20972         | Followup timepoint: NR<br>Outcome: NR (8.4)  | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Colorado    | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 25835         | Followup timepoint: NR<br>Outcome: NR (9.8)  | NR                      | Comparator: Arm1<br>Percent Difference: 0.9 (95% CI: (0.4 to 1.4)),<br>p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Colorado    | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 39612         | Followup timepoint: NR<br>Outcome: NR (9.6)  | NR                      | Comparator: Arm2<br>Percent Difference: -0.7 (95% CI: (-1.1 to -0.2)),<br>p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Colorado    | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 33057         | Followup timepoint: NR<br>Outcome: NR (8.5)  | NR                      | Comparator: Arm3<br>Percent Difference: -1 (95% CI: (-1.4 to -0.6)),<br>p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Connecticut | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 17973         | Followup timepoint: NR                       | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup    | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|-------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |             |       |                             | percentile on the CDC growth charts)   |      |               | Outcome: NR (16.9)                           |                         |  |                               |
| Pan, 2016 <sup>73, 74</sup> | Connecticut | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 18421         | Followup timepoint: NR<br>Outcome: NR (17.8) | NR                      | Comparator: Arm1<br>Percent Difference: 0.7 (95% CI: (-0.1 to 1.5)), p=NS            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Connecticut | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 22988         | Followup timepoint: NR<br>Outcome: NR (17.1) | NR                      | Comparator: Arm2<br>Percent Difference: -1 (95% CI: (-1.7 to -0.3)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Connecticut | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 19839         | Followup timepoint: NR<br>Outcome: NR (15.3) | NR                      | Comparator: Arm3<br>Percent Difference: -1.7 (95% CI: (-2.4 to -1.1)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Delaware    | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 4475          | Followup timepoint: NR<br>Outcome: NR (14.9) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Delaware    | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5993          | Followup timepoint: NR<br>Outcome: NR (15.5) | NR                      | Comparator: Arm1<br>Percent Difference: -0.3 (95% CI: (-1.6 to 1.1)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Delaware    | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7650          | Followup timepoint: NR<br>Outcome: NR (18.4) | NR                      | Comparator: Arm2<br>Percent Difference: 1.6 (95% CI: (0.4 to                         | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |          |       |                             |  |      |               |  |                         | 3.0)), p=Significant   |                               |
| Pan, 2016 <sup>73, 74</sup> | Delaware | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7251          | Followup timepoint: NR<br>Outcome: NR (17.2) | NR                      | Comparator: Arm3<br>Percent Difference: -0.3 (95% CI: (-1.5 to 1.0)), p=NS | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | DC       | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 4806          | Followup timepoint: NR<br>Outcome: NR (13.4) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | DC       | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5165          | Followup timepoint: NR<br>Outcome: NR (14)   | NR                      | Comparator: Arm1<br>Percent Difference: 0 (95% CI: (-1.3 to 1.3)), p=NS    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | DC       | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5182          | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm2<br>Percent Difference: -0.6 (95% CI: (-1.8 to 0.7)), p=NS | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | DC       | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 4608          | Followup timepoint: NR<br>Outcome: NR (13)   | NR                      | Comparator: Arm3<br>Percent Difference: -1.4 (95% CI: (-2.6 to 0.0)), p=NS | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Florida  | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 95465         | Followup timepoint: NR<br>Outcome: NR (13.2) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Florida  | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific  | NR   | 127203        | Followup timepoint:                          | NR                      | Comparator: Arm1   | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |          |       |                             | body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts)                                   |      |               | NR<br>Outcome: NR (14.5)                     |                         | Percent Difference: 0.8 (95% CI: (0.5 to 1.1)), p=Significant                        |                               |
| Pan, 2016 <sup>73, 74</sup> | Florida  | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 194924        | Followup timepoint: NR<br>Outcome: NR (14.6) | NR                      | Comparator: Arm2<br>Percent Difference: -0.5 (95% CI: (-0.7 to -0.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Florida  | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 182567        | Followup timepoint: NR<br>Outcome: NR (12.7) | NR                      | Comparator: Arm3<br>Percent Difference: -1.7 (95% CI: (-1.9 to -1.5)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Georgia  | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 58132         | Followup timepoint: NR<br>Outcome: NR (11.5) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Georgia  | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 78835         | Followup timepoint: NR<br>Outcome: NR (13.3) | NR                      | Comparator: Arm1<br>Percent Difference: 1 (95% CI: (0.6 to 1.4)), p=Significant      | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Georgia  | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 104959        | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm2<br>Percent Difference: 0.7 (95% CI: (0.4 to 1.0)), p=Significant    | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Georgia  | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 93386         | Followup timepoint: NR<br>Outcome: NR (13)   | NR                      | Comparator: Arm3<br>Percent Difference: -1.3 (95% CI: (-1.6 to -1.1)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hawaii   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 12377         | Followup timepoint: NR<br>Outcome: NR (11.7) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hawaii   | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | NR            | Followup timepoint: NR<br>Outcome: NR        | NR                      | Comparator: Arm1<br>Percent Difference: NR (95% CI: NR), p=NR                        | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hawaii   | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 14504         | Followup timepoint: NR<br>Outcome: NR (9.7)  | NR                      | Comparator: Arm2<br>Percent Difference: NR (95% CI: NR), p=NR                        | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hawaii   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 12987         | Followup timepoint: NR<br>Outcome: NR (10.3) | NR                      | Comparator: Arm3<br>Percent Difference: 0.6 (95% CI: (-0.1 to 1.3)), p=NS            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Idaho    | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 11729         | Followup timepoint: NR<br>Outcome: NR (10.8) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Idaho    | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-   | NR   | 12563         | Followup timepoint: NR                       | NR                      | Comparator: Arm1<br>Percent  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |          |       |                             | for-age $\geq$ the 95th percentile on the CDC growth charts)   |      |               | Outcome: NR (12.3)                           |                         | Difference: 1.4 (95% CI: 0.6 to 2.3)), p=Significant                                 |                               |
| Pan, 2016 <sup>73, 74</sup> | Idaho    | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 18704         | Followup timepoint: NR<br>Outcome: NR (11.9) | NR                      | Comparator: Arm2<br>Percent Difference: -0.9 (95% CI: (-1.5 to -0.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Idaho    | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 15087         | Followup timepoint: NR<br>Outcome: NR (11.6) | NR                      | Comparator: Arm3<br>Percent Difference: -0.5 (95% CI: (-1.1 to 0.2)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Illinois | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 76596         | Followup timepoint: NR<br>Outcome: NR (16.2) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Illinois | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 78564         | Followup timepoint: NR<br>Outcome: NR (20.3) | NR                      | Comparator: Arm1<br>Percent Difference: 3.3 (95% CI: (2.9 to 3.8)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Illinois | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 108762        | Followup timepoint: NR<br>Outcome: NR (15.7) | NR                      | Comparator: Arm2<br>Percent Difference: -5.3 (95% CI: (-5.6 to -5.0)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Illinois | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-   | NR   | 96060         | Followup timepoint: NR                       | NR                      | Comparator: Arm3<br>Percent  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |          |       |                             | for-age $\geq$ the 95th percentile on the CDC growth charts)   |      |               | Outcome: NR (15.2)                           |                         | Difference: -0.1 (95% CI: (-0.4 to 0.3)), p=NS                                       |                               |
| Pan, 2016 <sup>73, 74</sup> | Indiana  | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 37253         | Followup timepoint: NR<br>Outcome: NR (12.5) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Indiana  | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 40746         | Followup timepoint: NR<br>Outcome: NR (14.6) | NR                      | Comparator: Arm1<br>Percent Difference: 1.4 (95% CI: (0.9 to 1.9)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Indiana  | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 63220         | Followup timepoint: NR<br>Outcome: NR (15.1) | NR                      | Comparator: Arm2<br>Percent Difference: 0.3 (95% CI: (-0.2 to 0.7)), p=NS            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Indiana  | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 54717         | Followup timepoint: NR<br>Outcome: NR (14.3) | NR                      | Comparator: Arm3<br>Percent Difference: -0.8 (95% CI: (-1.1 to -0.4)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Iowa     | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 20622         | Followup timepoint: NR<br>Outcome: NR (12.7) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Iowa     | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 19016         | Followup timepoint: NR<br>Outcome: NR (15)   | NR                      | Comparator: Arm1<br>Percent Difference: 2 (95% CI: (1.3 to                           | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |          |       |                             | percentile on the CDC growth charts)   |      |               |  |                         | 2.7)), p=Significant   |                               |
| Pan, 2016 <sup>73, 74</sup> | Iowa     | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 29481         | Followup timepoint: NR<br>Outcome: NR (15.6) | NR                      | Comparator: Arm2<br>Percent Difference: -0.2 (95% CI: (-0.8 to 0.5)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Iowa     | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 24835         | Followup timepoint: NR<br>Outcome: NR (14.7) | NR                      | Comparator: Arm3<br>Percent Difference: -0.7 (95% CI: (-1.3 to -0.1)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Kansas   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 17750         | Followup timepoint: NR<br>Outcome: NR (11.8) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Kansas   | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 24336         | Followup timepoint: NR<br>Outcome: NR (16.7) | NR                      | Comparator: Arm1<br>Percent Difference: 4.5 (95% CI: (3.7 to 5.3)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Kansas   | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 30458         | Followup timepoint: NR<br>Outcome: NR (13.7) | NR                      | Comparator: Arm2<br>Percent Difference: -3.3 (95% CI: (-3.9 to -2.8)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Kansas   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 25532         | Followup timepoint: NR<br>Outcome: NR (12.8) | NR                      | Comparator: Arm3<br>Percent Difference: -1.1 (95% CI: (-1.6 to                       | Age, sex, and race/ethnicity. |



| Author, Year                | Subgroup  | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|-----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |           |       |                             | percentile on the CDC growth charts)   |      |               |  |                         | -0.5)), p=Significant  |                               |
| Pan, 2016 <sup>73, 74</sup> | Kentucky  | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 37609         | Followup timepoint: NR<br>Outcome: NR (14.6) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Kentucky  | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 41122         | Followup timepoint: NR<br>Outcome: NR (16.7) | NR                      | Comparator: Arm1<br>Percent Difference: 2 (95% CI: (1.4 to 2.5)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Kentucky  | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 45761         | Followup timepoint: NR<br>Outcome: NR (18.2) | NR                      | Comparator: Arm2<br>Percent Difference: 1.2 (95% CI: (0.7 to 1.8)), p=Significant  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Kentucky  | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 44355         | Followup timepoint: NR<br>Outcome: NR (13.3) | NR                      | Comparator: Arm3<br>Percent Difference: -5 (95% CI: (-5.4 to -4.6)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Louisiana | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 28800         | Followup timepoint: NR<br>Outcome: NR (12.4) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Louisiana | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 35556         | Followup timepoint: NR<br>Outcome: NR (14.8) | NR                      | Comparator: Arm1<br>Percent Difference: 2.4 (95% CI: 1.8 to                        | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup  | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|-----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |           |       |                             | percentile on the CDC growth charts)   |      |               |  |                         | 3.0)), p=Significant   |                               |
| Pan, 2016 <sup>73, 74</sup> | Louisiana | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 48145         | Followup timepoint: NR<br>Outcome: NR (13.8) | NR                      | Comparator: Arm2<br>Percent Difference: -1.4 (95% CI: (-1.8 to -0.9)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Louisiana | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 39507         | Followup timepoint: NR<br>Outcome: NR (13.2) | NR                      | Comparator: Arm3<br>Percent Difference: -0.8 (95% CI: (-1.2 to -0.4)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Maine     | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7325          | Followup timepoint: NR<br>Outcome: NR (14.1) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Maine     | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7722          | Followup timepoint: NR<br>Outcome: NR (16.7) | NR                      | Comparator: Arm1<br>Percent Difference: 2.5 (95% CI: (1.3 to 3.8)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Maine     | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 10410         | Followup timepoint: NR<br>Outcome: NR (15.2) | NR                      | Comparator: Arm2<br>Percent Difference: -1.6 (95% CI: (-2.6 to -0.5)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Maine     | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 9034          | Followup timepoint: NR                       | NR                      | Comparator: Arm3<br>Percent Difference: -0.2   | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup      | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|---------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |               |       |                             | percentile on the CDC growth charts)   |      |               | Outcome: NR (15.1)                           |                         | (95% CI: (-1.1 to 0.9)), p=NS  |                               |
| Pan, 2016 <sup>73, 74</sup> | Maryland      | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 26943         | Followup timepoint: NR<br>Outcome: NR (13.3) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Maryland      | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 34104         | Followup timepoint: NR<br>Outcome: NR (14.9) | NR                      | Comparator: Arm1<br>Percent Difference: 0.8 (95% CI: (0.3 to 1.4)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Maryland      | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 51280         | Followup timepoint: NR<br>Outcome: NR (17.1) | NR                      | Comparator: Arm2<br>Percent Difference: 0.6 (95% CI: 0.1 to 1.1)), p=Significant     | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Maryland      | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 49008         | Followup timepoint: NR<br>Outcome: NR (16.5) | NR                      | Comparator: Arm3<br>Percent Difference: -0.6 (95% CI: (-1.1 to -0.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Massachusetts | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 43334         | Followup timepoint: NR<br>Outcome: NR (16.3) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Massachusetts | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 42986         | Followup timepoint: NR<br>Outcome: NR (18.1) | NR                      | Comparator: Arm1<br>Percent Difference: 1.5 (95% CI: (1.0 to                         | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup      | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|---------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |               |       |                             | percentile on the CDC growth charts)   |      |               |  |                         | 2.1)), p=Significant   |                               |
| Pan, 2016 <sup>73, 74</sup> | Massachusetts | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 49178         | Followup timepoint: NR<br>Outcome: NR (17.1) | NR                      | Comparator: Arm2<br>Percent Difference: -1 (95% CI: (-1.5 to -0.5)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Massachusetts | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 44350         | Followup timepoint: NR<br>Outcome: NR (16.6) | NR                      | Comparator: Arm3<br>Percent Difference: -0.7 (95% CI: (-1.2 to -0.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Michigan      | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 76127         | Followup timepoint: NR<br>Outcome: NR (12.3) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Michigan      | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 79619         | Followup timepoint: NR<br>Outcome: NR (13.9) | NR                      | Comparator: Arm1<br>Percent Difference: 1.3 (95% CI: (0.9 to 1.6)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Michigan      | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 85293         | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm2<br>Percent Difference: 0.2 (95% CI: (-0.1 to 0.6)), p=NS            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Michigan      | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 76139         | Followup timepoint: NR<br>Outcome: NR (13.4) | NR                      | Comparator: Arm3<br>Percent Difference: -0.7 (95% CI: (-1.0 to                       | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup    | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|-------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |             |       |                             | percentile on the CDC growth charts)   |      |               |  |                         | -0.3)), p=Significant  |                               |
| Pan, 2016 <sup>73, 74</sup> | Minnesota   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 28340         | Followup timepoint: NR<br>Outcome: NR (12.6) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Minnesota   | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 41316         | Followup timepoint: NR<br>Outcome: NR (13.9) | NR                      | Comparator: Arm1<br>Percent Difference: 1.3 (95% CI: (0.8 to 1.9)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Minnesota   | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 57529         | Followup timepoint: NR<br>Outcome: NR (12.7) | NR                      | Comparator: Arm2<br>Percent Difference: -1.8 (95% CI: (-2.2 to -1.4)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Minnesota   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 47773         | Followup timepoint: NR<br>Outcome: NR (12.3) | NR                      | Comparator: Arm3<br>Percent Difference: -0.6 (95% CI: (-1.0 to -0.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Mississippi | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 20068         | Followup timepoint: NR<br>Outcome: NR (13.2) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Mississippi | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 28505         | Followup timepoint: NR<br>Outcome: NR (16.4) | NR                      | Comparator: Arm1<br>Percent Difference: 3.3 (95% CI: (2.6 to                         | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup    | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|-------------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |             |       |                             | percentile on the CDC growth charts)   |      |               |  |                         | 4.1)), p=Significant  |                               |
| Pan, 2016 <sup>73, 74</sup> | Mississippi | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 36519         | Followup timepoint: NR<br>Outcome: NR (14.9) | NR                      | Comparator: Arm2<br>Percent Difference: -1.8 (95% CI: (-2.3 to -1.2), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Mississippi | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 26007         | Followup timepoint: NR<br>Outcome: NR (14.5) | NR                      | Comparator: Arm3<br>Percent Difference: -0.5 (95% CI: (-1.1 to 0.0)), p=NS          | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Missouri    | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 42380         | Followup timepoint: NR<br>Outcome: NR (12)   | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Missouri    | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 44784         | Followup timepoint: NR<br>Outcome: NR (14.6) | NR                      | Comparator: Arm1<br>Percent Difference: 2.3 (95% CI: (1.8 to 2.8)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Missouri    | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 50575         | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm2<br>Percent Difference: -0.2 (95% CI: (-0.6 to 0.2)), p=NS          | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Missouri    | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 43895         | Followup timepoint: NR<br>Outcome: NR (13)   | NR                      | Comparator: Arm3<br>Percent Difference: -1.5 (95% CI: (-1.9 to                      | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |          |       |                             |  |      |               |  |                         | -1.1)), p=Significant   |                               |
| Pan, 2016 <sup>73, 74</sup> | Montana  | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7435          | Followup timepoint: NR<br>Outcome: NR (10.5) | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Montana  | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7509          | Followup timepoint: NR<br>Outcome: NR (12.2) | NR                      | Comparator: Arm1<br>Percent Difference: 1.5 (95% CI: (0.5 to 2.6)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Montana  | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7194          | Followup timepoint: NR<br>Outcome: NR (13.4) | NR                      | Comparator: Arm2<br>Percent Difference: 0.9 (95% CI: (-0.1 to 2.1)), p=NS         | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Montana  | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7288          | Followup timepoint: NR<br>Outcome: NR (12.5) | NR                      | Comparator: Arm3<br>Percent Difference: -0.9 (95% CI: (-1.9 to 0.1)), p=NS        | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Nebraska | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 10444         | Followup timepoint: NR<br>Outcome: NR (13.2) | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Nebraska | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 13859         | Followup timepoint: NR<br>Outcome: NR (14.2) | NR                      | Comparator: Arm1<br>Percent Difference: 0.1 (95% CI: (-0.7 to 1.0)), p=NS         | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Nebraska | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 15622         | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm2<br>Percent Difference: -0.4 (95% CI: (-1.1 to 0.4)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Nebraska | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 13726         | Followup timepoint: NR<br>Outcome: NR (16.9) | NR                      | Comparator: Arm3<br>Percent Difference: 2.5 (95% CI: (1.6 to 3.4)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Nevada   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 14955         | Followup timepoint: NR<br>Outcome: NR (11.8) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Nevada   | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 13801         | Followup timepoint: NR<br>Outcome: NR (15.7) | NR                      | Comparator: Arm1<br>Percent Difference: 3.4 (95% CI: (2.6 to 4.3)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Nevada   | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 25855         | Followup timepoint: NR<br>Outcome: NR (15)   | NR                      | Comparator: Arm2<br>Percent Difference: -0.9 (95% CI: (-1.6 to -0.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Nevada   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 26884         | Followup timepoint: NR<br>Outcome: NR (12)   | NR                      | Comparator: Arm3<br>Percent Difference: -2.8 (95% CI: (-3.3 to -2.2)), p=Significant | Age, sex, and race/ethnicity. |



| Author, Year                | Subgroup      | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|---------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | New Hampshire | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5667          | Followup timepoint: NR<br>Outcome: NR (14.2) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Hampshire | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5707          | Followup timepoint: NR<br>Outcome: NR (14.8) | NR                      | Comparator: Arm1<br>Percent Difference: 0.4 (95% CI: (-0.9 to 1.7)), p=NS  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Hampshire | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7263          | Followup timepoint: NR<br>Outcome: NR (15)   | NR                      | Comparator: Arm2<br>Percent Difference: 0.1 (95% CI: (-1.1 to 1.4)), p=NS  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Hampshire | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5551          | Followup timepoint: NR<br>Outcome: NR (15.1) | NR                      | Comparator: Arm3<br>Percent Difference: 0 (95% CI: (-1.2 to 1.3)), p=NS    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Jersey    | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 37374         | Followup timepoint: NR<br>Outcome: NR (18.6) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Jersey    | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 43686         | Followup timepoint: NR<br>Outcome: NR (18.7) | NR                      | Comparator: Arm1<br>Percent Difference: -0.3 (95% CI: (-0.8 to 0.2)), p=NS | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Jersey    | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 59000         | Followup timepoint: NR                       | NR                      | Comparator: Arm2<br>Percent Difference: -0.5                               | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup   | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |            |       |                             | percentile on the CDC growth charts)   |      |               | Outcome: NR (18.9)                           |                         | (95% CI: (-1.0 to -0.1)), p=Significant  |                               |
| Pan, 2016 <sup>73, 74</sup> | New Jersey | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 56815         | Followup timepoint: NR<br>Outcome: NR (15.3) | NR                      | Comparator: Arm3<br>Percent Difference: -3.4 (95% CI: (-3.8 to -3.0)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Mexico | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 19951         | Followup timepoint: NR<br>Outcome: NR (8.2)  | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Mexico | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 19047         | Followup timepoint: NR<br>Outcome: NR (11)   | NR                      | Comparator: Arm1<br>Percent Difference: 2.8 (95% CI: (2.1 to 3.5)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Mexico | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 21968         | Followup timepoint: NR<br>Outcome: NR (15.7) | NR                      | Comparator: Arm2<br>Percent Difference: 4.4 (95% CI: (3.7 to 5.2)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New Mexico | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 20515         | Followup timepoint: NR<br>Outcome: NR (12.5) | NR                      | Comparator: Arm3<br>Percent Difference: -3.3 (95% CI: (-3.9 to -2.7)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New York   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-   | NR   | 151124        | Followup timepoint: NR                       | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup       | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|----------------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |                |       |                             | for-age $\geq$ the 95th percentile on the CDC growth charts)   |      |               | Outcome: NR (16.5)                           |                         |   |                               |
| Pan, 2016 <sup>73, 74</sup> | New York       | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 161904        | Followup timepoint: NR<br>Outcome: NR (17.4) | NR                      | Comparator: Arm1<br>Percent Difference: 0.7 (95% CI: 0.4 to 1.0)),<br>p=Significant     | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New York       | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 186760        | Followup timepoint: NR<br>Outcome: NR (16.1) | NR                      | Comparator: Arm2<br>Percent Difference: -1.5 (95% CI: (-1.7 to -1.3)),<br>p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | New York       | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 195413        | Followup timepoint: NR<br>Outcome: NR (14.3) | NR                      | Comparator: Arm3<br>Percent Difference: -1.7 (95% CI: (-1.9 to -1.5)),<br>p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | North Carolina | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 52651         | Followup timepoint: NR<br>Outcome: NR (11.6) | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | North Carolina | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 62956         | Followup timepoint: NR<br>Outcome: NR (13.6) | NR                      | Comparator: Arm1<br>Percent Difference: 1.3 (95% CI: (0.9 to 1.7)),<br>p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | North Carolina | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-   | NR   | 89798         | Followup timepoint: NR                       | NR                      | Comparator: Arm2<br>Percent   | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup       | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|----------------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |                |       |                             | for-age $\geq$ the 95th percentile on the CDC growth charts)   |      |               | Outcome: NR (13.9)                           |                         | Difference: -0.4 (95% CI: (-0.7 to -0.03)), p=Significant                         |                               |
| Pan, 2016 <sup>73, 74</sup> | North Carolina | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 92407         | Followup timepoint: NR<br>Outcome: NR (15)   | NR                      | Comparator: Arm3<br>Percent Difference: 1.3 (95% CI: (1.0 to 1.6)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | North Dakota   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5049          | Followup timepoint: NR<br>Outcome: NR (10.8) | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | North Dakota   | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 4848          | Followup timepoint: NR<br>Outcome: NR (12.7) | NR                      | Comparator: Arm1<br>Percent Difference: 1.5 (95% CI: (0.2 to 2.9)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | North Dakota   | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5484          | Followup timepoint: NR<br>Outcome: NR (14.5) | NR                      | Comparator: Arm2<br>Percent Difference: 1.2 (95% CI: (-0.1 to 2.6)), p=NS         | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | North Dakota   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 4586          | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm3<br>Percent Difference: 0 (95% CI: (-1.3 to 1.4)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Ohio           | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 78769         | Followup timepoint: NR                       | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |          |       |                             | percentile on the CDC growth charts)   |      |               | Outcome: NR (11.6)                           |                         |  |                               |
| Pan, 2016 <sup>73, 74</sup> | Ohio     | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 88873         | Followup timepoint: NR<br>Outcome: NR (12.1) | NR                      | Comparator: Arm1<br>Percent Difference: 0.3 (95% CI: (0.0 to 0.6)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Ohio     | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 102803        | Followup timepoint: NR<br>Outcome: NR (12.6) | NR                      | Comparator: Arm2<br>Percent Difference: 0.4 (95% CI: (0.1 to 0.7)), p=Significant  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Ohio     | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 81440         | Followup timepoint: NR<br>Outcome: NR (13.1) | NR                      | Comparator: Arm3<br>Percent Difference: 0.3 (95% CI: (0.03 to 0.6)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Oklahoma | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 28650         | Followup timepoint: NR<br>Outcome: NR (11.1) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Oklahoma | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 27244         | Followup timepoint: NR<br>Outcome: NR (13.7) | NR                      | Comparator: Arm1<br>Percent Difference: 2 (95% CI: (1.4 to 2.6)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Oklahoma | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 37849         | Followup timepoint: NR<br>Outcome: NR (15.4) | NR                      | Comparator: Arm2<br>Percent Difference: 1.2 (95% CI: (0.6 to                       | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup     | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|--------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |              |       |                             | percentile on the CDC growth charts)   |      |               |  |                         | 1.8)), p=Significant   |                               |
| Pan, 2016 <sup>73, 74</sup> | Oklahoma     | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 32754         | Followup timepoint: NR<br>Outcome: NR (13.8) | NR                      | Comparator: Arm3<br>Percent Difference: -1.7 (95% CI: (-2.2 to -1.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Oregon       | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 23948         | Followup timepoint: NR<br>Outcome: NR (14.7) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Oregon       | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 33521         | Followup timepoint: NR<br>Outcome: NR (14.8) | NR                      | Comparator: Arm1<br>Percent Difference: -0.4 (95% CI: (-1.0 to 0.2)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Oregon       | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 43209         | Followup timepoint: NR<br>Outcome: NR (15.8) | NR                      | Comparator: Arm2<br>Percent Difference: 0.5 (95% CI: (0.03 to 1.0)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Oregon       | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 38378         | Followup timepoint: NR<br>Outcome: NR (15)   | NR                      | Comparator: Arm3<br>Percent Difference: -0.7 (95% CI: (-1.2 to -0.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Pennsylvania | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 77518         | Followup timepoint: NR<br>Outcome: NR (12.1) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup     | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|--------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |              |       |                             | percentile on the CDC growth charts)   |      |               |  |                         |  |                               |
| Pan, 2016 <sup>73, 74</sup> | Pennsylvania | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 81491         | Followup timepoint: NR<br>Outcome: NR (12.6) | NR                      | Comparator: Arm1<br>Percent Difference: 0.2 (95% CI: (-0.1 to 0.5)), p=NS          | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Pennsylvania | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 96762         | Followup timepoint: NR<br>Outcome: NR (12.8) | NR                      | Comparator: Arm2<br>Percent Difference: 0 (95% CI: (-0.3 to 0.3)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Pennsylvania | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 84996         | Followup timepoint: NR<br>Outcome: NR (12.9) | NR                      | Comparator: Arm3<br>Percent Difference: 0.1 (95% CI: (-0.2 to 0.4)), p=NS          | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Rhode Island | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7005          | Followup timepoint: NR<br>Outcome: NR (17.3) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Rhode Island | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7498          | Followup timepoint: NR<br>Outcome: NR (18.3) | NR                      | Comparator: Arm1<br>Percent Difference: 0.8 (95% CI: (-0.4 to 2.1)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Rhode Island | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 10783         | Followup timepoint: NR<br>Outcome: NR (16.4) | NR                      | Comparator: Arm2<br>Percent Difference: -1.9 (95% CI: (-2.9 to                     | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup       | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|----------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |                |       |                             |  |      |               |  |                         | -0.8)), p=Significant  |                               |
| Pan, 2016 <sup>73, 74</sup> | Rhode Island   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 8853          | Followup timepoint: NR<br>Outcome: NR (16.3) | NR                      | Comparator: Arm3<br>Percent Difference: -0.3 (95% CI: (-1.3 to 0.8)), p=Significant  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | South Carolina | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 27083         | Followup timepoint: NR<br>Outcome: NR (12.3) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | South Carolina | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 28169         | Followup timepoint: NR<br>Outcome: NR (15.6) | NR                      | Comparator: Arm1<br>Percent Difference: 2.8 (95% CI: (2.2 to 3.4)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | South Carolina | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 39785         | Followup timepoint: NR<br>Outcome: NR (13.3) | NR                      | Comparator: Arm2<br>Percent Difference: -2.8 (95% CI: (-3.2 to -2.3)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | South Carolina | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 32346         | Followup timepoint: NR<br>Outcome: NR (12)   | NR                      | Comparator: Arm3<br>Percent Difference: -1.4 (95% CI: (-1.8 to -0.9)), p=NS          | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | South Dakota   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 6274          | Followup timepoint: NR<br>Outcome: NR (12)   | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |



| Author, Year                | Subgroup     | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|--------------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |              |       |                             | percentile on the CDC growth charts)   |      |               |  |                         |   |                               |
| Pan, 2016 <sup>73, 74</sup> | South Dakota | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 6697          | Followup timepoint: NR<br>Outcome: NR (14.9) | NR                      | Comparator: Arm1<br>Percent Difference: 3.1 (95% CI: (1.8 to 4.5)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | South Dakota | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 7884          | Followup timepoint: NR<br>Outcome: NR (17.3) | NR                      | Comparator: Arm2<br>Percent Difference: 1.5 (95% CI: (0.3 to 2.8)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | South Dakota | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5179          | Followup timepoint: NR<br>Outcome: NR (17.1) | NR                      | Comparator: Arm3<br>Percent Difference: -0.5 (95% CI: (-1.7 to 0.9)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Tennessee    | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 43309         | Followup timepoint: NR<br>Outcome: NR (11.8) | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Tennessee    | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 48114         | Followup timepoint: NR<br>Outcome: NR (13.5) | NR                      | Comparator: Arm1<br>Percent Difference: 1.2 (95% CI: (0.7 to 1.6)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Tennessee    | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 57153         | Followup timepoint: NR                       | NR                      | Comparator: Arm2<br>Percent Difference: 1.7   | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup  | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|-----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |           |       |                             | percentile on the CDC growth charts)   |      |               | Outcome: NR (16)                             |                         | (95% CI: (1.3 to 2.2)), p=Significant  |                               |
| Pan, 2016 <sup>73, 74</sup> | Tennessee | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 54429         | Followup timepoint: NR<br>Outcome: NR (14.9) | NR                      | Comparator: Arm3<br>Percent Difference: -1 (95% CI: (-1.4 to -0.6)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Texas     | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 255124        | Followup timepoint: NR<br>Outcome: NR (12.5) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Texas     | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 306999        | Followup timepoint: NR<br>Outcome: NR (15.9) | NR                      | Comparator: Arm1<br>Percent Difference: 3.3 (95% CI: (3.1 to 3.5)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Texas     | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 361823        | Followup timepoint: NR<br>Outcome: NR (16.9) | NR                      | Comparator: Arm2<br>Percent Difference: 0.7 (95% CI: (0.5 to 0.8)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Texas     | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 307498        | Followup timepoint: NR<br>Outcome: NR (14.9) | NR                      | Comparator: Arm3<br>Percent Difference: -1.6 (95% CI: (-1.8 to -1.5)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Utah      | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-   | NR   | 19555         | Followup timepoint: NR                       | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |          |       |                             | for-age $\geq$ the 95th percentile on the CDC growth charts)   |      |               | Outcome: NR (10.3)                           |                         |   |                               |
| Pan, 2016 <sup>73, 74</sup> | Utah     | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 21345         | Followup timepoint: NR<br>Outcome: NR (12.3) | NR                      | Comparator: Arm1<br>Percent Difference: 2 (95% CI: 1.3 to 2.7)),<br>p=Significant       | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Utah     | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 26045         | Followup timepoint: NR<br>Outcome: NR (12.5) | NR                      | Comparator: Arm2<br>Percent Difference: -0.7 (95% CI: (-1.2 to -0.1)),<br>p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Utah     | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 22919         | Followup timepoint: NR<br>Outcome: NR (8.2)  | NR                      | Comparator: Arm3<br>Percent Difference: -4.3 (95% CI: (-4.7 to -3.8)),<br>p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Vermont  | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5848          | Followup timepoint: NR<br>Outcome: NR (12.5) | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Vermont  | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 6308          | Followup timepoint: NR<br>Outcome: NR (14.6) | NR                      | Comparator: Arm1<br>Percent Difference: 2 (95% CI: (0.7 to 3.3)),<br>p=Significant      | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Vermont  | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-   | NR   | 6964          | Followup timepoint: NR                       | NR                      | Comparator: Arm2<br>Percent   | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup   | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |            |       |                             | for-age $\geq$ the 95th percentile on the CDC growth charts)   |      |               | Outcome: NR (13.8)                           |                         | Difference: -0.7 (95% CI: (-1.8 to 0.6)), p=NS                                       |                               |
| Pan, 2016 <sup>73, 74</sup> | Vermont    | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 5574          | Followup timepoint: NR<br>Outcome: NR (14.1) | NR                      | Comparator: Arm3<br>Percent Difference: -4.3 (95% CI: (-1.1 to 1.4)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Virginia   | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 45135         | Followup timepoint: NR<br>Outcome: NR (14)   | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Virginia   | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 42233         | Followup timepoint: NR<br>Outcome: NR (18.3) | NR                      | Comparator: Arm1<br>Percent Difference: 3.8 (95% CI: (3.2 to 4.3)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Virginia   | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 48920         | Followup timepoint: NR<br>Outcome: NR (21.5) | NR                      | Comparator: Arm2<br>Percent Difference: 1.7 (95% CI: (1.2 to 2.2)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Virginia   | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 57983         | Followup timepoint: NR<br>Outcome: NR (20)   | NR                      | Comparator: Arm3<br>Percent Difference: -1.5 (95% CI: (-2.0 to -1.1)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Washington | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 56173         | Followup timepoint: NR                       | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup      | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference  | Adjusted Factors              |
|-----------------------------|---------------|-------|-----------------------------|--|------|---------------|--|-------------------------|---|-------------------------------|
|                             |               |       |                             | percentile on the CDC growth charts)   |      |               | Outcome: NR (13.4)                           |                         |   |                               |
| Pan, 2016 <sup>73, 74</sup> | Washington    | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 63851         | Followup timepoint: NR<br>Outcome: NR (14.5) | NR                      | Comparator: Arm1<br>Percent Difference: 0.7 (95% CI: (0.3 to 1.1)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Washington    | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 78336         | Followup timepoint: NR<br>Outcome: NR (14.9) | NR                      | Comparator: Arm2<br>Percent Difference: -0.3 (95% CI: (-0.7 to 0.1)), p=NS          | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Washington    | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 76564         | Followup timepoint: NR<br>Outcome: NR (13.6) | NR                      | Comparator: Arm3<br>Percent Difference: -1.4 (95% CI: -1.7 to -1.1)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | West Virginia | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 15654         | Followup timepoint: NR<br>Outcome: NR (11.9) | NR                      | Comparator: Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | West Virginia | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 17687         | Followup timepoint: NR<br>Outcome: NR (13.7) | NR                      | Comparator: Arm1<br>Percent Difference: 1.6 (95% CI: (0.9 to 2.4)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | West Virginia | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 17669         | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm2<br>Percent Difference: 0.8 (95% CI: (0.1 to                        | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup      | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|---------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |               |       |                             | percentile on the CDC growth charts)   |      |               |  |                         | 1.6)), p=Significant   |                               |
| Pan, 2016 <sup>73, 74</sup> | West Virginia | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 14902         | Followup timepoint: NR<br>Outcome: NR (16.4) | NR                      | Comparator: Arm3<br>Percent Difference: 1.9 (95% CI: (1.1 to 2.8)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Wisconsin     | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 35780         | Followup timepoint: NR<br>Outcome: NR (11.6) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Wisconsin     | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 39710         | Followup timepoint: NR<br>Outcome: NR (14.4) | NR                      | Comparator: Arm1<br>Percent Difference: 2.5 (95% CI: (2.0 to 3.0)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Wisconsin     | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 48511         | Followup timepoint: NR<br>Outcome: NR (15.2) | NR                      | Comparator: Arm2<br>Percent Difference: 0.2 (95% CI: (-0.2 to 0.7)), p=NS            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Wisconsin     | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 39965         | Followup timepoint: NR<br>Outcome: NR (14.7) | NR                      | Comparator: Arm3<br>Percent Difference: -0.6 (95% CI: (-1.1 to -0.2)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Wyoming       | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th                                      | NR   | 3596          | Followup timepoint: NR<br>Outcome: NR (8.1)  | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup      | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|---------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |               |       |                             | percentile on the CDC growth charts)   |      |               |  |                         |  |                               |
| Pan, 2016 <sup>73, 74</sup> | Wyoming       | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 3658          | Followup timepoint: NR<br>Outcome: NR (10)   | NR                      | Comparator: Arm1<br>Percent Difference: 2.1 (95% CI: (0.7 to 3.7)), p=Significant    | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Wyoming       | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 4413          | Followup timepoint: NR<br>Outcome: NR (11.8) | NR                      | Comparator: Arm2<br>Percent Difference: 1 (95% CI: (-0.3 to 2.5)), p=NS              | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Wyoming       | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 3731          | Followup timepoint: NR<br>Outcome: NR (9.9)  | NR                      | Comparator: Arm3<br>Percent Difference: -2.1 (95% CI: (-3.2 to -0.8)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | America Samoa | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 2028          | Followup timepoint: NR<br>Outcome: NR (16.5) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | America Samoa | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 3157          | Followup timepoint: NR<br>Outcome: NR (16.8) | NR                      | Comparator: Arm1<br>Percent Difference: 0.4 (95% CI: (-1.6 to 2.7)), p=NS            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | America Samoa | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 3221          | Followup timepoint: NR<br>Outcome: NR (14.6) | NR                      | Comparator: Arm2<br>Percent Difference: -2.3 (95% CI: (-3.9 to                       | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup                 | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|--------------------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
|                             |                          |       |                             |  |      |               |  |                         | -0.6)), p=Significant  |                               |
| Pan, 2016 <sup>73, 74</sup> | America Samoa            | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 3160          | Followup timepoint: NR<br>Outcome: NR (16.3) | NR                      | Comparator: Arm3<br>Percent Difference: 1.6 (95% CI: (-0.1 to 3.6)), p=NS            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Guam                     | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 1415          | Followup timepoint: NR<br>Outcome: NR (10.7) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Guam                     | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 1842          | Followup timepoint: NR<br>Outcome: NR (11.6) | NR                      | Comparator: Arm1<br>Percent Difference: 0.7 (95% CI: (-1.3 to 3.2)), p=NS            | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Guam                     | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 3248          | Followup timepoint: NR<br>Outcome: NR (11.4) | NR                      | Comparator: Arm2<br>Percent Difference: -0.1 (95% CI: (-1.8 to 1.9)), p=NS           | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Guam                     | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 2737          | Followup timepoint: NR<br>Outcome: NR (8.7)  | NR                      | Comparator: Arm3<br>Percent Difference: -2.8 (95% CI: (-4.1 to -1.4)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Northern Mariana Islands | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | NR            | Followup timepoint: NR<br>Outcome: NR        | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |



| Author, Year                | Subgroup                 | Arm   | Arm Name                    | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors              |
|-----------------------------|--------------------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Northern Mariana Islands | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | NR            | Followup timepoint: NR<br>Outcome: NR        | NR                      | Comparator: Arm1<br>Percent Difference: NR (95% CI: NR), p=NR                        | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Northern Mariana Islands | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 2157          | Followup timepoint: NR<br>Outcome: NR (14.1) | NR                      | Comparator: Arm2<br>Percent Difference: NR (95% CI: NR), p=NR                        | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Northern Mariana Islands | Arm 5 | 2014 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 1808          | Followup timepoint: NR<br>Outcome: NR (9)    | NR                      | Comparator: Arm3<br>Percent Difference: -5.3 (95% CI: (-6.7 to -3.5)), p=Significant | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Puerto Rico              | Arm 1 | 2000 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 75865         | Followup timepoint: NR<br>Outcome: NR (22.1) | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Puerto Rico              | Arm 2 | 2004 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 85711         | Followup timepoint: NR<br>Outcome: NR (21.3) | NR                      | Comparator: Arm1<br>Percent Difference: -1 (95% CI: (-1.4 to -0.6)), p=Significant   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Puerto Rico              | Arm 3 | 2010 Child WIC Participants | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 70699         | Followup timepoint: NR<br>Outcome: NR (20.3) | NR                      | Comparator: Arm2<br>Percent Difference: -1.1 (95% CI: (-1.4 to -0.7)), p=Significant | Age, sex, and race/ethnicity. |

| Author, Year                 | Subgroup       | Arm   | Arm Name                      | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                              | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|----------------|-------|-------------------------------|--|------|---------------|---|-------------------------|--|--|
| Pan, 2016 <sup>73, 74</sup>  | Puerto Rico    | Arm 5 | 2014 Child WIC Participants   | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 74118         | Followup timepoint: NR<br>Outcome: NR (13.9)        | NR                      | Comparator: Arm3<br>Percent Difference: -6.4 (95% CI: (-6.7 to -6.1)), p=Significant | Age, sex, and race/ethnicity.  |
| Pan, 2016 <sup>73, 74</sup>  | Virgin Islands | Arm 1 | 2000 Child WIC Participants   | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 2686          | Followup timepoint: NR<br>Outcome: NR (11.4)        | NR                      | Comparator: Ref  | Age, sex, and race/ethnicity.  |
| Pan, 2016 <sup>73, 74</sup>  | Virgin Islands | Arm 2 | 2004 Child WIC Participants   | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 2156          | Followup timepoint: NR<br>Outcome: NR (12)          | NR                      | Comparator: Arm1<br>Percent Difference: 0.5 (95% CI: (-1.2 to 2.5)), p=NS            | Age, sex, and race/ethnicity.  |
| Pan, 2016 <sup>73, 74</sup>  | Virgin Islands | Arm 3 | 2010 Child WIC Participants   | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 2093          | Followup timepoint: NR<br>Outcome: NR (12.4)        | NR                      | Comparator: Arm2<br>Percent Difference: 0.4 (95% CI: (-1.5 to 2.5)), p=NS            | Age, sex, and race/ethnicity.  |
| Pan, 2016 <sup>73, 74</sup>  | Virgin Islands | Arm 5 | 2014 Child WIC Participants   | Prevalence of obese (sex-specific body mass index-for-age $\geq$ the 95th percentile on the CDC growth charts) | NR   | 1816          | Followup timepoint: NR<br>Outcome: NR (11.9)        | NR                      | Comparator: Arm3<br>Percent Difference: -0.5 (95% CI: (-2.4 to 1.7)), p=NS           | Age, sex, and race/ethnicity.  |
| Chiasson, 2016 <sup>62</sup> | NR             | Arm 1 | Old WIC food package exposure | Obesity (BMI $\geq$ 95th percentile)   | NR   | 23781         | Followup timepoint: 3 years<br>Outcome: 3690 (49.9) | NR                      | Comparator: Ref  | Race, New York City residence, mother's breastfeeding package, birth weight, and year of WIC enrollment on obesity at age 3. they also report adjusted that if mothers at enrollment chose full bfdg package (adjusted for |

| Author, Year                  | Subgroup | Arm   | Arm Name                             | Outcome Definition             | Tool | N at Analysis | Followup Outcome, n(%)                              | Within-group Difference | Between-group Difference                                    | Adjusted Factors   |
|-------------------------------|----------|-------|--------------------------------------|--------------------------------|------|---------------|---|-------------------------|---|--|
|                               |          |       |                                      |                                |      |               |   |                         |   | partial and compared to IFF) that their risk of obesity at age 3 was 0.51 (0.43–0.62) P=.001   |
| Chiasson , 2016 <sup>62</sup> | NR       | Arm 2 | New WIC food package exposure        | Obesity (BMI ≥95th percentile) | NR   | 23506         | Followup timepoint: 3 years<br>Outcome: 3698 (50.1) | NR                      | Comparator: Arm1<br>OR: 1.02 (95% CI: 0.94 to 1.11), p=0.42 | Race, New York City residence, mother's breastfeeding package, birth weight, and year of WIC enrollment on obesity at age 3                      |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 1 | Fully breastfeed, old package only   | Obesity                        | NR   | 4332          | Followup timepoint: 4 years of age<br>Outcome: NR   | NR                      | Comparator: Arm3<br>RR: 1 (95% CI: 0.86 to 1.16), p=NS      | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 2 | Fully breastfeed, mixed package only | Obesity                        | NR   | 4332          | Followup timepoint: 4 years of age<br>Outcome: NR   | NR                      | Comparator: Arm3<br>RR: 1.02 (95% CI: 0.88 to 1.18), p=NS   | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 3 | Fully breastfeed, new package only   | Obesity                        | NR   | 4332          | Followup timepoint: 4 years of age<br>Outcome: NR   | NR                      | Comparator: Ref   | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 4 | Mostly breastfeed, old package only  | Obesity                        | NR   | 12345         | Followup timepoint: 4 years of age<br>Outcome: NR   | NR                      | Comparator: Arm6<br>RR: 1.27 (95% CI: 1.17 to 1.38), p≤0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 5 | Mostly breastfeed,                   | Obesity                        | NR   | 12345         | Followup timepoint:                                 | NR                      | Comparator: Arm6  | Poisson regression models accommodated   |

| Author, Year                 | Subgroup | Arm    | Arm Name                            | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                     | Adjusted Factors   |
|------------------------------|----------|--------|-------------------------------------|--------------------|------|---------------|---|-------------------------|--|--|
|                              |          |        | mixed package only                  |                    |      |               | 4 years of age<br>Outcome: NR                     |                         | RR: 1.17 (95% CI: 1.07 to 1.27), p≤0.05                      | clustering within matched triplets and included interactions between WIC infant package group and period.  |
| Chaparro, 2020 <sup>60</sup> | Boys     | Arm 6  | Mostly breastfeed, new package only | Obesity            | NR   | 12345         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref  | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro, 2020 <sup>60</sup> | Boys     | Arm 7  | Mostly formula, old package only    | Obesity            | NR   | 25230         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm9<br>RR: 1.07 (95% CI: 1.02 to 1.13), p≤0.05  | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro, 2020 <sup>60</sup> | Boys     | Arm 8  | Mostly formula, mixed package only  | Obesity            | NR   | 25230         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm9<br>RR: 1.06 (95% CI: 1.01 to 1.12), p≤0.05  | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro, 2020 <sup>60</sup> | Boys     | Arm 9  | Mostly formula, new package only    | Obesity            | NR   | 25230         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref  | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro, 2020 <sup>60</sup> | Boys     | Arm 10 | Fully formula, old package only     | Obesity            | NR   | 17868         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm12<br>RR: 1.13 (95% CI: 1.06 to 1.20), p≤0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |

| Author, Year                  | Subgroup | Arm    | Arm Name                             | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                    | Adjusted Factors   |
|-------------------------------|----------|--------|--------------------------------------|--------------------|------|---------------|---|-------------------------|---|--|
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 11 | Fully formula, mixed package only    | Obesity            | NR   | 17868         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm12<br>RR: 1.03 (95% CI: 0.97 to 1.10), p=NS  | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 12 | Fully formula, new package only      | Obesity            | NR   | 17868         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 1  | Fully breastfeed, old package only   | Obesity            | NR   | 4797          | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.1 (95% CI: 0.94 to 1.30), p=NS    | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 2  | Fully breastfeed, mixed package only | Obesity            | NR   | 4797          | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.1 (95% CI: 0.93 to 1.29), p=NS    | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 3  | Fully breastfeed, new package only   | Obesity            | NR   | 4797          | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 4  | Mostly breastfeed, old package only  | Obesity            | NR   | 12519         | Followup timepoint: 4 years of age                | NR                      | Comparator: Arm6<br>RR: 1.17 (95% CI: 1.07 to 1.28), p≤0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC                                  |

| Author, Year                  | Subgroup | Arm    | Arm Name                              | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                  | Adjusted Factors   |
|-------------------------------|----------|--------|---------------------------------------|--------------------|------|---------------|---|-------------------------|---|--|
|                               |          |        |                                       |                    |      |               | Outcome: NR                                       |                         |   | infant package group and period.   |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 5  | Mostly breastfeed, mixed package only | Obesity            | NR   | 12519         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm6<br>RR: 1.07 (95% CI: 0.98 to 1.17), p=NS | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 6  | Mostly breastfeed, new package only   | Obesity            | NR   | 12519         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 7  | Mostly formula, old package only      | Obesity            | NR   | 23250         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm9<br>RR: 1.06 (95% CI: 1.00 to 1.12), p=NS | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 8  | Mostly formula, mixed package only    | Obesity            | NR   | 23250         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm9<br>RR: 1.06 (95% CI: 1.00 to 1.13), p=NS | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 9  | Mostly formula, new package only      | Obesity            | NR   | 23250         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 10 | Fully formula, old package only       | Obesity            | NR   | 16650         | Followup timepoint: 4 years of                    | NR                      | Comparator: Arm12<br>RR: 1.07 (95%                        | Poisson regression models accommodated clustering within matched   |

| Author, Year                  | Subgroup | Arm    | Arm Name                              | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                    | Adjusted Factors   |
|-------------------------------|----------|--------|---------------------------------------|--------------------|------|---------------|---|-------------------------|---|--|
|                               |          |        |                                       |                    |      |               | age<br>Outcome: NR                                |                         | CI: 1.00 to 1.14), p=NS                                     | triplets and included interactions between WIC infant package group and period.  |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 11 | Fully formula, mixed package only     | Obesity            | NR   | 16650         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm12<br>RR: 1.04 (95% CI: 0.97 to 1.11), p=NS  | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 12 | Fully formula, new package only       | Obesity            | NR   | 16650         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 4  | Mostly breastfeed, old package only   | Obesity            | NR   | 12345         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.26 (95% CI: 1.12 to 1.42), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 5  | Mostly breastfeed, mixed package only | Obesity            | NR   | 12345         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.16 (95% CI: 1.03 to 1.31), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 6  | Mostly breastfeed, new package only   | Obesity            | NR   | 12345         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 0.99 (95% CI: 0.88 to 1.12), p=NS   | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |

| Author, Year                  | Subgroup | Arm    | Arm Name                           | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                    | Adjusted Factors   |
|-------------------------------|----------|--------|------------------------------------|--------------------|------|---------------|---|-------------------------|---|--|
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 7  | Mostly formula, old package only   | Obesity            | NR   | 25230         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.33 (95% CI: 1.19 to 1.49), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 8  | Mostly formula, mixed package only | Obesity            | NR   | 25230         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.32 (95% CI: 1.18 to 1.48), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 9  | Mostly formula, new package only   | Obesity            | NR   | 25230         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.24 (95% CI: 1.11 to 1.39), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 10 | Fully formula, old package only    | Obesity            | NR   | 17868         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.46 (95% CI: 1.31 to 1.64), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 11 | Fully formula, mixed package only  | Obesity            | NR   | 17868         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.34 (95% CI: 1.19 to 1.50), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Boys     | Arm 12 | Fully formula, new package only    | Obesity            | NR   | 17868         | Followup timepoint: 4 years of age                | NR                      | Comparator: Arm3<br>RR: 1.29 (95% CI: 1.15 to 1.45), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC                                  |



| Author, Year                  | Subgroup | Arm   | Arm Name                              | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                    | Adjusted Factors   |
|-------------------------------|----------|-------|---------------------------------------|--------------------|------|---------------|---|-------------------------|---|--|
|                               |          |       |                                       |                    |      |               | Outcome: NR                                       |                         |   | infant package group and period.   |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 4 | Mostly breastfeed, old package only   | Obesity            | NR   | 12519         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.47 (95% CI: 1.29 to 1.68), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 5 | Mostly breastfeed, mixed package only | Obesity            | NR   | 12519         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.35 (95% CI: 1.18 to 1.54), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 6 | Mostly breastfeed, new package only   | Obesity            | NR   | 12519         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.26 (95% CI: 1.10 to 1.44), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 7 | Mostly formula, old package only      | Obesity            | NR   | 23250         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.55 (95% CI: 1.37 to 1.76), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 8 | Mostly formula, mixed package only    | Obesity            | NR   | 23250         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.56 (95% CI: 1.37 to 1.77), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 9 | Mostly formula, new package only      | Obesity            | NR   | 23250         | Followup timepoint: 4 years of                    | NR                      | Comparator: Arm3<br>RR: 1.47 (95%                           | Poisson regression models accommodated clustering within matched   |

| Author, Year                  | Subgroup | Arm    | Arm Name                          | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                    | Adjusted Factors   |
|-------------------------------|----------|--------|-----------------------------------|--------------------|------|---------------|---|-------------------------|---|--|
|                               |          |        |                                   |                    |      |               | age<br>Outcome: NR                                |                         | CI: 1.29 to 1.66), p<0.05                                   | triplets and included interactions between WIC infant package group and period.  |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 10 | Fully formula, old package only   | Obesity            | NR   | 16650         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.69 (95% CI: 1.49 to 1.93), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 11 | Fully formula, mixed package only | Obesity            | NR   | 16650         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.64 (95% CI: 1.44 to 1.87), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2020 <sup>60</sup> | Girls    | Arm 12 | Fully formula, new package only   | Obesity            | NR   | 16650         | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 1.59 (95% CI: 1.39 to 1.80), p<0.05 | Poisson regression models accommodated clustering within matched triplets and included interactions between WIC infant package group and period. |
| Chaparro , 2019 <sup>57</sup> | Boys     | Arm 1  | Full dose (old package)           | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models  |
| Chaparro , 2019 <sup>57</sup> | Boys     | Arm 2  | Full dose (new package)           | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm1<br>RR: 0.88 (95% CI: 0.86 to 0.91), p<0.05 | Poisson regression models  |
| Chaparro , 2019 <sup>57</sup> | Boys     | Arm 3  | Late dose (old package)           | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of                    | NR                      | Comparator: Ref   | Poisson regression models  |

| Author, Year                  | Subgroup | Arm   | Arm Name                | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                         | Within-group Difference | Between-group Difference                                    | Adjusted Factors          |
|-------------------------------|----------|-------|-------------------------|--------------------|------|---------------|--|-------------------------|---|---------------------------|
|                               |          |       |                         |                    |      |               | age Outcome: NR                                |                         |   |                           |
| Chaparro , 2019 <sup>57</sup> | Boys     | Arm 4 | Late dose (new package) | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age Outcome: NR | NR                      | Comparator: Arm3<br>RR: 0.89 (95% CI: 0.81 to 0.98), p<0.05 | Poisson regression models |
| Chaparro , 2019 <sup>57</sup> | Boys     | Arm 4 | Late dose (new package) | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models |
| Chaparro , 2019 <sup>57</sup> | Boys     | Arm 2 | Full dose (new package) | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age Outcome: NR | NR                      | Comparator: Arm 4<br>RR: 1.04 (95% CI: 0.90 to 1.20), p=NS  | Poisson regression models |
| Chaparro , 2019 <sup>57</sup> | Girls    | Arm 1 | Full dose (old package) | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models |
| Chaparro , 2019 <sup>57</sup> | Girls    | Arm 2 | Full dose (new package) | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age Outcome: NR | NR                      | Comparator: Arm1<br>RR: 0.9 (95% CI: 0.87 to 0.93), p<0.05  | Poisson regression models |
| Chaparro , 2019 <sup>57</sup> | Girls    | Arm 3 | Late dose (old package) | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models |

| Author, Year                  | Subgroup | Arm   | Arm Name                  | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference                                    | Adjusted Factors   |
|-------------------------------|----------|-------|---------------------------|--------------------|------|---------------|---|-------------------------|---|--|
| Chaparro , 2019 <sup>57</sup> | Girls    | Arm 4 | Late dose (new package)   | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 0.99 (95% CI: 0.89 to 1.10), p=NS   | Poisson regression models  |
| Chaparro , 2019 <sup>57</sup> | Girls    | Arm 4 | Late dose (new package)   | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models  |
| Chaparro , 2019 <sup>57</sup> | Girls    | Arm 2 | Full dose (new package)   | Obesity at age 4   | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR | NR                      | Comparator: Arm4<br>RR: 0.92 (95% CI: 0.79 to 1.08), p=NS   | Poisson regression models  |
| Chaparro , 2019 <sup>58</sup> | Boys     | Arm 1 | Low WHZ (old package)     | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Boys     | Arm 2 | Low WHZ (new package)     | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Arm1<br>RR: 0.86 (95% CI: 0.76 to 0.96), p<0.01 | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Boys     | Arm 3 | Average WHZ (old package) | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Boys     | Arm 4 | Average WHZ (new package) | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age                | NR                      | Comparator: Arm3<br>RR: 0.87 (95%                           | Poisson regression models, includes interaction between WHZ strata and WIC package |

| Author, Year                  | Subgroup | Arm   | Arm Name                  | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                            | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|----------|-------|---------------------------|--------------------|------|---------------|---|-------------------------|---|--|
|                               |          |       |                           |                    |      |               | Outcome: NR                                       |                         | CI: 99% CI: 0.81 to 0.93), p<0.01                                   |  |
| Chaparro , 2019 <sup>58</sup> | Boys     | Arm 5 | Hlgh WHZ (old package)    | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Boys     | Arm 6 | High WHZ (new package)    | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Arm5<br>RR: 0.9 (95% CI: 99% CI: 0.84 to 0.97), p<0.01  | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Girls    | Arm 1 | Low WHZ (old package)     | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Ref<br>RR: Ref (95% CI: Ref), p=Ref                     | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Girls    | Arm 2 | Low WHZ (new package)     | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Arm1<br>RR: 0.88 (95% CI: 99% CI: 0.77 to 1.01), pNS    | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Girls    | Arm 3 | Average WHZ (old package) | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Ref   | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Girls    | Arm 4 | Average WHZ (new package) | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR | NR                      | Comparator: Arm3<br>RR: 0.84 (95% CI: 99% CI: 0.78 to 0.90), p<0.01 | Poisson regression models, includes interaction between WHZ strata and WIC package |
| Chaparro , 2019 <sup>58</sup> | Girls    | Arm 5 | Hlgh WHZ (old package)    | Obesity at age 5   | NR   | NR            | Followup timepoint:                               | NR                      | Comparator: Ref   | Poisson regression models, includes  |

| Author, Year                 | Subgroup                       | Arm   | Arm Name                     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|--------------------------------|-------|------------------------------|--|------|---------------|---|-------------------------|---|--|
|                              |                                |       |                              |  |      |               | 5 years of age<br>Outcome: NR                           |                         |   | interaction between WHZ strata and WIC package   |
| Chaparro, 2019 <sup>58</sup> | Girls                          | Arm 6 | High WHZ (new package)       | Obesity at age 5   | NR   | NR            | Followup timepoint: 5 years of age<br>Outcome: NR       | NR                      | Comparator: Arm 5<br>RR: 1 (95% CI: 99% CI: 0.92 to 1.08), p=NS | Poisson regression models, includes interaction between WHZ strata and WIC package   |
| Anderson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 5 | 4 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.76 (95% CI: 0.72,0.80), p=NR         | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Anderson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 6 | 5 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.70,0.78), p=NR         | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Anderson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 7 | 6 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.69,0.78), p=NR         | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Anderson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 8 | 7 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.69,0.78), p=NR         | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                       | Arm    | Arm Name                      | Outcome Definition                                     | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|--------------------------------|--------|-------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                |        |                               |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 9  | 8 months fully breastfeeding  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.69,0.78), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 10 | 9 months fully breastfeeding  | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.69,0.79), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 11 | 10 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.75 (95% CI: 0.71,0.80), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 12 | 11 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.76 (95% CI: 0.72,0.81), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, pre 2009 Package | Arm 13 | 12 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.77 (95% CI: 0.74,0.81), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                        | Arm    | Arm Name                      | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|---------------------------------|--------|-------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                 |        |                               |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: male, pre 2009 Package  | Arm 14 | 13 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.78 (95% CI: 0.74,0.83), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 1  | 0 months fully breastfeeding  | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Ref   | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 2  | 1 months fully breastfeeding  | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.9 (95% CI: 0.87,0.94), p=NR  | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 3  | 2 months fully breastfeeding  | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.84 (95% CI: 0.79,0.89), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 4  | 3 months fully breastfeeding  | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.79 (95% CI: 0.73,0.85), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |



| Author, Year                  | Subgroup                        | Arm   | Arm Name                     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|---------------------------------|-------|------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                 |       |                              |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 5 | 4 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.76 (95% CI: 0.70,0.82), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 6 | 5 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.67,0.81), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 7 | 6 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.65,0.81), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 8 | 7 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.64,0.82), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 9 | 8 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.63,0.84), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                        | Arm    | Arm Name                      | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|---------------------------------|--------|-------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                 |        |                               |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 10 | 9 months fully breastfeeding  | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.63,0.85), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 11 | 10 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.64,0.85), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 12 | 11 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.66,0.83), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 13 | 12 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.68,0.80), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: male, post 2009 Package | Arm 14 | 13 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.68,0.79), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                         | Arm     | Arm Name                     | Outcome Definition                                     | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|----------------------------------|---------|------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                  |         |                              |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: male                     | Overall | Overall                      | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | NR  | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 1   | 0 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Ref   | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 2   | 1 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.88 (95% CI: 0.85,0.90), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 3   | 2 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.8 (95% CI: 0.76,0.84), p=NR  | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 4   | 3 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.75 (95% CI: 0.71,0.80), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                         | Arm   | Arm Name                     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|----------------------------------|-------|------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                  |       |                              |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 5 | 4 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.68,0.77), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 6 | 5 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.72 (95% CI: 0.67,0.76), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 7 | 6 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.72 (95% CI: 0.67,0.77), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 8 | 7 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.68,0.78), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 9 | 8 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.68,0.79), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                         | Arm    | Arm Name                      | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|----------------------------------|--------|-------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                  |        |                               |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 10 | 9 months fully breastfeeding  | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.69,0.80), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 11 | 10 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.74 (95% CI: 0.69,0.80), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 12 | 11 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.69,0.78), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 13 | 12 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.71 (95% CI: 0.67,0.75), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, pre 2009 Package | Arm 14 | 13 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.67 (95% CI: 0.62,0.71), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                          | Arm   | Arm Name                     | Outcome Definition                                     | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|-----------------------------------|-------|------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                   |       |                              |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 1 | 0 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Ref   | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 2 | 1 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.94 (95% CI: 0.90,0.98), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 3 | 2 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.89 (95% CI: 0.83,0.95), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 4 | 3 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.85 (95% CI: 0.79,0.92), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 5 | 4 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.82 (95% CI: 0.75,0.90), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                          | Arm    | Arm Name                     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|-----------------------------------|--------|------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                   |        |                              |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 6  | 5 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.8 (95% CI: 0.73,0.88), p=NR  | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 7  | 6 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.78 (95% CI: 0.70,0.88), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 8  | 7 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.77 (95% CI: 0.67,0.87), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 9  | 8 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.75 (95% CI: 0.65,0.87), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 10 | 9 months fully breastfeeding | sex specific BMI $\geq$ 95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.73 (95% CI: 0.63,0.85), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |

| Author, Year                  | Subgroup                          | Arm     | Arm Name                      | Outcome Definition                                     | Tool | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|-------------------------------|-----------------------------------|---------|-------------------------------|--|------|---------------|---|-------------------------|---|--|
|                               |                                   |         |                               |  |      |               |   |                         |   | of birth, year of birth squared  |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 11  | 10 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.71 (95% CI: 0.62,0.82), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 12  | 11 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.69 (95% CI: 0.61,0.78), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 13  | 12 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.66 (95% CI: 0.61,0.73), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female, post 2009 Package | Arm 14  | 13 months fully breastfeeding | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | Comparator: Arm 1<br>RR: 0.63 (95% CI: 0.58,0.69), p=NR | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year of birth, year of birth squared |
| Andersson, 2020 <sup>52</sup> | gender: female                    | Overall | Overall                       | sex specific BMI ≥95th percentile for age (CDC curves) | NR   | NR            | Followup timepoint: 4 years of age<br>Outcome: NR (100) | Not applicable          | NR  | child race/ethnicity; age at last weight measurement; maternal education, maternal language preference, family income, initial weight status, year                                 |



| Author, Year                 | Subgroup  | Arm   | Arm Name             | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|------------------------------|---|-------|----------------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
|                              |   |       |                      |  |      |               |                                       |                         |   | of birth, year of birth squared  |
| Anderson, 2020 <sup>51</sup> | Median healthy and unhealthy food environment densities | Arm 1 | Boys and old package | obesity at age 4, defined as sex-specific BMI >95th percentile as per CDC criteria | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not applicable          | Comparator: Ref   | child race/ethnicity, initial child WHZ, maternal education, maternal language preference, household income, neighborhood characteristics (pop density, % residents with HS education, % with household income <100% FPL, % non-white) |
| Anderson, 2020 <sup>51</sup> | Median healthy and unhealthy food environment densities | Arm 2 | Boys and new package | obesity at age 4, defined as sex-specific BMI >95th percentile as per CDC criteria | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not applicable          | Comparator: Arm 1<br>RR: 0.91 (95% CI: 0.88,0.95), p=NR | child race/ethnicity, initial child WHZ, maternal education, maternal language preference, household income, neighborhood characteristics (pop density, % residents with HS education, % with household income <100% FPL, % non-white) |
| Anderson, 2020 <sup>51</sup> | Healthiest food environments                            | Arm 1 | Boys and old package | obesity at age 4, defined as sex-specific BMI >95th percentile as per CDC criteria | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not applicable          | Comparator: Ref   | child race/ethnicity, initial child WHZ, maternal education, maternal language preference, household income, neighborhood characteristics (pop density, % residents with HS education, % with household income <100% FPL, % non-white) |
| Anderson, 2020 <sup>51</sup> | Healthiest food environments                            | Arm 2 | Boys and new package | obesity at age 4, defined as sex-specific BMI >95th percentile as per CDC criteria | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not applicable          | Comparator: Arm 1<br>RR: 0.82 (95% CI: 0.76-0.90), p=NR | child race/ethnicity, initial child WHZ, maternal education, maternal language preference, household income,   |

| Author, Year                 | Subgroup  | Arm   | Arm Name              | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|------------------------------|---|-------|-----------------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
|                              |   |       |                       |  |      |               |                                       |                         |   | neighborhood characteristics (pop density, % residents with HS education, % with household income <100% FPL, % non-white)  |
| Anderson, 2020 <sup>51</sup> | Median healthy and unhealthy food environment densities | Arm 3 | Girls and old package | obesity at age 4, defined as sex-specific BMI >95th percentile as per CDC criteria | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not applicable          | Comparator: Ref   | child race/ethnicity, initial child WHZ, maternal education, maternal language preference, household income, neighborhood characteristics (pop density, % residents with HS education, % with household income <100% FPL, % non-white) |
| Anderson, 2020 <sup>51</sup> | Median healthy and unhealthy food environment densities | Arm 4 | Girls and new package | obesity at age 4, defined as sex-specific BMI >95th percentile as per CDC criteria | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not applicable          | Comparator: Arm 3<br>RR: 0.95 (95% CI: 0.91-0.98), p=NR | child race/ethnicity, initial child WHZ, maternal education, maternal language preference, household income, neighborhood characteristics (pop density, % residents with HS education, % with household income <100% FPL, % non-white) |
| Anderson, 2020 <sup>51</sup> | Healthiest food environments                            | Arm 3 | Girls and old package | obesity at age 4, defined as sex-specific BMI >95th percentile as per CDC criteria | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not applicable          | Comparator: Ref   | child race/ethnicity, initial child WHZ, maternal education, maternal language preference, household income, neighborhood characteristics (pop density, % residents with HS education, % with household income <100% FPL, % non-white) |

| Author, Year                 | Subgroup                     | Arm   | Arm Name              | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                                | Adjusted Factors   |
|------------------------------|------------------------------|-------|-----------------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
| Anderson, 2020 <sup>51</sup> | Healthiest food environments | Arm 4 | Girls and new package | obesity at age 4, defined as sex-specific BMI >95th percentile as per CDC criteria | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | Not applicable          | Comparator: Arm 3<br>RR: 0.85 (95% CI: 0.77-0.93), p=NR | child race/ethnicity, initial child WHZ, maternal education, maternal language preference, household income, neighborhood characteristics (pop density, % residents with HS education, % with household income <100% FPL, % non-white) |

BMI=body mass index; CDC=Centers for Disease Control and Prevention; CI=confidence interval; n=sample size; NA=not available; NH=non-Hispanic; NR=not reported; p=p-value; Ref=reference; RR=risk ratio; WHZ= WHZ= weight-for-length/height z-score; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-172. Infant and child weight categorical outcomes (weight for age) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm 1 | 0 stressors | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 0.92 (95% CI: 0.84-1.01), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 1 | 0 stressors | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 1.04 (95% CI: 0.81-1.33), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm 3 | 2 stressors | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 1.18 (95% CI: 1.02-1.37), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3 | 2 stressors | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 0.9 (95% CI: 0.69-1.37), p>0.06  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm           | Arm Name                  | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|---------------|---------------------------|--|---|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm s 2 and 1 | 1 stressor or 0 stressors | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 3         | 2 stressors               | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 1.1 (95% CI: 0.96-1.26), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm s 2 and 1 | 1 stressor or 0 stressors | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile | 2000 age-sex standardized growth charts from NCHS/CDC | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition  | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|-------|-------------|---|---|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3 | 2 stressors | Risk of underweight = weight-for-age under the 5th percentile OR weight-for length under the 10th percentile  | 2000 age-sex standardized growth charts from NCHS/CDC | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 0.91 (95% CI: 0.61-1.34), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 1 | 0 stressors | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 0.96 (95% CI: 0.87-1.05), p>0.06      | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |



| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition  | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|-------------|---|---|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 1 | 0 stressors | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 1.02 (95% CI: 0.78-1.33), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm 3 | 2 stressors | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m <sup>2</sup> ) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 1.04 (95% CI: 0.9-1.21), p>0.06  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m <sup>2</sup> ) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3 | 2 stressors | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m <sup>2</sup> ) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 1.41 (95% CI: 0.95-2.09), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm           | Arm Name                  | Outcome Definition  | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|---------------|---------------------------|---|---|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm s 2 and 1 | 1 stressor or 0 stressors | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 3         | 2 stressors               | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 1.01 (95% CI: 0.88-1.16), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm s 2 and 1 | 1 stressor or 0 stressors | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition  | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|----------|-------|-------------|---|---|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3 | 2 stressors | Overweight =weight-for-age OR weight-for-length above the 95th percentile for children younger than 24 months or BMI (kg/m2) above the 85th percentile for children aged 24-35 months | 2000 age-sex standardized growth charts from NCHS/CDC | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 1.48 (95% CI: 1.04-2.11), p=0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 1 | 0 stressors | weight-for-age z score, least squares mean  | 2000 age-sex standardized growth charts from NCHS/CDC | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | weight-for-age z score, least squares mean  | 2000 age-sex standardized growth charts from NCHS/CDC | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>p=0.36                                    | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition                         | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference              | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|-------------------------|---------------------------------------|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 1 | 0 stressors | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1           | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>p=0.21 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 2 | 1 stressor  | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2           | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition                         | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference              | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|-------------------------|---------------------------------------|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm 3 | 2 stressors | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>p=0.56 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 2 | 1 stressor  | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2           | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3 | 2 stressors | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>p=0.35 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm           | Arm Name                  | Outcome Definition                         | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                   | Adjusted Factors   |
|---------------------------|----------|---------------|---------------------------|--|---|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | WIC      | Arm s 2 and 1 | 1 stressor or 0 stressors | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1           | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC      | Arm 3         | 2 stressors               | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>p=0.96 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC   | Arm s 2 and 1 | 1 stressor or 0 stressors | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1           | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

| Author, Year              | Subgroup | Arm   | Arm Name    | Outcome Definition                         | Tool  | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference                   | Adjusted Factors   |
|---------------------------|----------|-------|-------------|--|---|---------------|---------------------------------------|-------------------------|--|--|
| Black, 2012 <sup>26</sup> | No WIC   | Arm 3 | 2 stressors | weight-for-age z score, least squares mean | 2000 age-sex standardized growth charts from NCHS/CDC | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>p=0.13 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |

BMI=body mass index; CDC=Centers for Disease Control and Prevention; CI=confidence interval; n=sample size; NA=not available; NCHS=National Center for Health Statistics; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-173. Infant and child weight categorical outcomes (weight for age) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | NR       | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 3307442       | Followup timepoint: NR<br>Outcome: 32.5 ((32.5-32.6)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | NR       | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 3261106       | Followup timepoint: NR<br>Outcome: 31.2 ((31.1-31.2)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | NR       | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 3016487       | Followup timepoint: NR<br>Outcome: 30.2 ((30.1-30.2)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | NR       | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 2818594       | Followup timepoint: NR<br>Outcome: 29.1 ((29.1-29.2)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.90 (95% CI: 0.90 to 0.90)<br>Prevalence ratio: -3.2 (95% CI: -3.3 to -3.2), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup    | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|-------------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Age 2 years | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1333334       | Followup timepoint: NR<br>Outcome: 30.2 ((30.2-30.3)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 2 years | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1268827       | Followup timepoint: NR<br>Outcome: 28.6 ((28.5-28.7)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 2 years | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1198411       | Followup timepoint: NR<br>Outcome: 27.5 ((27.5-27.6)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 2 years | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1152176       | Followup timepoint: NR<br>Outcome: 27.1 ((27.0-27.2)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.90 (95% CI: 0.90 to 0.90)<br>Prevalence ratio: -3.0 (95% CI: -3.1 to -2.9), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup    | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|-------------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Age 3 years | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1166350       | Followup timepoint: NR<br>Outcome: 33.4 ((33.3-33.4)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 3 years | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1173931       | Followup timepoint: NR<br>Outcome: 32 ((31.9-32.1))   | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 3 years | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1106205       | Followup timepoint: NR<br>Outcome: 31.1 ((31.1-31.2)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 3 years | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1027505       | Followup timepoint: NR<br>Outcome: 29.7 ((29.7-29.8)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.90 (95% CI: 0.89 to 0.90)<br>Prevalence ratio: -3.5 (95% CI: -3.6 to -3.4), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup   | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|------------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Age 4years | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 807758        | Followup timepoint: NR<br>Outcome: 35.2 ((35.1-35.3)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 4years | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 818348        | Followup timepoint: NR<br>Outcome: 33.9 ((33.8-34.0)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 4years | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 711871        | Followup timepoint: NR<br>Outcome: 33.2 ((33.1-33.3)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 4years | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 638913        | Followup timepoint: NR<br>Outcome: 31.7 ((31.5-31.8)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.91 (95% CI: 0.90 to 0.91)<br>Prevalence ratio: -3.3 (95% CI: -3.5 to -3.2), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Male     | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1676395       | Followup timepoint: NR<br>Outcome: 33.5 ((33.4-33.6)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Male     | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1654510       | Followup timepoint: NR<br>Outcome: 31.8 ((31.8-31.9)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Male     | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1532467       | Followup timepoint: NR<br>Outcome: 30.9 ((30.8-31.0)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Male     | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1431197       | Followup timepoint: NR<br>Outcome: 29.6 ((29.5-29.6)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.89 (95% CI: 0.88 to 0.89)<br>Prevalence ratio: -3.8 (95% CI: -3.9 to -3.7), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Female   | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1631047       | Followup timepoint: NR<br>Outcome: 31.5 ((31.5-31.6)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Female   | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1606596       | Followup timepoint: NR<br>Outcome: 30.5 ((30.4-30.5)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Female   | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1484020       | Followup timepoint: NR<br>Outcome: 29.5 ((29.4-29.6)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Female   | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1387397       | Followup timepoint: NR<br>Outcome: 28.6 ((28.6-28.7)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.92 (95% CI: 0.91 to 0.92)<br>Prevalence ratio: -2.7 (95% CI: -2.8 to -2.6), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup           | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|--------------------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic White | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 966673        | Followup timepoint: NR<br>Outcome: 28.8 ((28.7-28.9)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic White | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 919697        | Followup timepoint: NR<br>Outcome: 27.8 ((27.7-27.9)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic White | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 841132        | Followup timepoint: NR<br>Outcome: 27.7 ((27.6-27.8)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic White | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 776843        | Followup timepoint: NR<br>Outcome: 27.4 ((27.3-27.5)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.95 (95% CI: 0.95 to 0.96)<br>Prevalence ratio: -1.4 (95% CI: -1.5 to -1.3), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup           | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|--------------------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic Black | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 618580        | Followup timepoint: NR<br>Outcome: 27.3 ((27.2-27.4)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic Black | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 634965        | Followup timepoint: NR<br>Outcome: 26.3 ((26.2-26.4)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic Black | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 615395        | Followup timepoint: NR<br>Outcome: 25.9 ((25.8-26.0)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic Black | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 594060        | Followup timepoint: NR<br>Outcome: 25 ((24.9-25.1))   | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.92 (95% CI: 0.91 to 0.92)<br>Prevalence ratio: -2.2 (95% CI: -2.4 to -2.1), p<0.001 | Age, sex, and race/ethnicity. |



| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Hispanic | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1536644       | Followup timepoint: NR<br>Outcome: 37.2 ((37.1-37.3)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hispanic | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1513145       | Followup timepoint: NR<br>Outcome: 35.5 ((35.4-35.6)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hispanic | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1389135       | Followup timepoint: NR<br>Outcome: 34 ((33.9-34.1))   | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hispanic | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 1274650       | Followup timepoint: NR<br>Outcome: 32.6 ((32.5-32.6)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.88 (95% CI: 0.87 to 0.88)<br>Prevalence ratio: -4.6 (95% CI: -4.7 to -4.5), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup                      | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|-------------------------------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | American Indian/Alaska Native | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 38661         | Followup timepoint: NR<br>Outcome: 10.3 ((39.8-40.8)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | American Indian/Alaska Native | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 40814         | Followup timepoint: NR<br>Outcome: 37.5 ((37.0-37.9)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | American Indian/Alaska Native | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 36456         | Followup timepoint: NR<br>Outcome: 36.2 ((35.7-36.7)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | American Indian/Alaska Native | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 35682         | Followup timepoint: NR<br>Outcome: 36.7 ((36.2-37.2)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.91 (95% CI: 0.90 to 0.93)<br>Prevalence ratio: -3.6 (95% CI: -4.2 to -2.9), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup               | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)                                | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|------------------------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Asian/Pacific Islander | Arm 3 | 2010 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 121667        | Followup timepoint: NR<br>Outcome: 26.6 ((26.4-26.9)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Asian/Pacific Islander | Arm 4 | 2012 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 130252        | Followup timepoint: NR<br>Outcome: 25.2 ((25.0-25.5)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Asian/Pacific Islander | Arm 5 | 2014 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 129770        | Followup timepoint: NR<br>Outcome: 24.2 ((24.0-24.4)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Asian/Pacific Islander | Arm 6 | 2016 Child WIC participants | Overweight or Obesity (BMI at or above the 85th percentile for age and sex on the CDC growth charts) | NR   | 136141        | Followup timepoint: NR<br>Outcome: 22.4 ((22.1-22.6)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.84 (95% CI: 0.83 to 0.85)<br>Prevalence ratio: -4.2 (95% CI: -4.5 to -3.9), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)   | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | NR       | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 3307442       | Followup timepoint: NR<br>Outcome: 15.9 ((95% CI: 15.9 to 16.0)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | NR       | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 3261106       | Followup timepoint: NR<br>Outcome: 15.2 ((95% CI: 15.1 to 15.2)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | NR       | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 3016487       | Followup timepoint: NR<br>Outcome: 14.5 ((95% CI: 14.5 to 14.6)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | NR       | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 2818594       | Followup timepoint: NR<br>Outcome: 13.9 ((95% CI: 13.9 to 13.9)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.88 (95% CI: 0.88 to 0.89)<br>Prevalence ratio: -1.9 (95% CI: -1.9 to -1.8), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup    | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)   | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|-------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Age 2 years | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1333334       | Followup timepoint: NR<br>Outcome: 14.1 ((95% CI: 14.0 to 14.1)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 2 years | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1268827       | Followup timepoint: NR<br>Outcome: 13.2 ((95% CI: 13.1 to 13.3)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 2 years | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1198411       | Followup timepoint: NR<br>Outcome: 12.5 ((95% CI: 12.4 to 12.5)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 2 years | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1152176       | Followup timepoint: NR<br>Outcome: 12.3 ((95% CI: 12.2 to 12.3)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.88 (95% CI: 0.87 to 0.88)<br>Prevalence ratio: -1.7 (95% CI: -1.8 to -1.6), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup    | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome , N(%)  | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|-------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Age 3 years | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1166350       | Followup timepoint: NR<br>Outcome: 16.6 ((95% CI: 16.6 to 16.7)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 3 years | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1173931       | Followup timepoint: NR<br>Outcome: 15.9 ((95% CI: 15.8 to 15.9)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 3 years | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1106205       | Followup timepoint: NR<br>Outcome: 15.4 ((95% CI: 15.3 to 15.4)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 3 years | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1027505       | Followup timepoint: NR<br>Outcome: 14.5 ((95% CI: 14.5 to 14.6)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.88 (95% CI: 0.87 to 0.88)<br>Prevalence ratio: -2.0 (95% CI: -2.1 to -1.9), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup   | Arm   | Arm Name                     | Outcome Definition   | Tool | N At Analysis | Followup Outcome , N(%)  | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|------------|-------|------------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Age 4years | Arm 3 | 2010 Child WIC participant s | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 807758        | Followup timepoint: NR<br>Outcome: 17.9 ((95% CI: 17.8 to 18.0)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 4years | Arm 4 | 2012 Child WIC participant s | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 818348        | Followup timepoint: NR<br>Outcome: 17.2 ((95% CI: 17.1 to 17.3)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 4years | Arm 5 | 2014 Child WIC participant s | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 711871        | Followup timepoint: NR<br>Outcome: 16.8 ((95% CI: 16.7 to 16.9)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Age 4years | Arm 6 | 2016 Child WIC participant s | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 638913        | Followup timepoint: NR<br>Outcome: 15.8 ((95% CI: 15.7 to 15.9)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.89 (95% CI: 0.88 to 0.90)<br>Prevalence ratio: -2.0 (95% CI: -2.1 to -1.9), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)   | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Male     | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1676395       | Followup timepoint: NR<br>Outcome: 16.8 ((95% CI: 16.7 to 16.9)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Male     | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1654510       | Followup timepoint: NR<br>Outcome: 15.9 ((95% CI: 15.8 to 15.9)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Male     | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1532467       | Followup timepoint: NR<br>Outcome: 15.2 ((95% CI: 15.1 to 15.2)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Male     | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1431197       | Followup timepoint: NR<br>Outcome: 14.4 ((95% CI: 14.3 to 14.5)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.87 (95% CI: 0.86 to 0.87)<br>Prevalence ratio: -2.2 (95% CI: -2.3 to -2.2), p<0.001 | Age, sex, and race/ethnicity. |



| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)   | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Female   | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1631047       | Followup timepoint: NR<br>Outcome: 15 ((95% CI: 14.9 to 15.1))   | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Female   | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1606596       | Followup timepoint: NR<br>Outcome: 14.4 ((95% CI: 14.4 to 14.5)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Female   | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1484020       | Followup timepoint: NR<br>Outcome: 13.9 ((95% CI: 13.8 to 14.0)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Female   | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1387397       | Followup timepoint: NR<br>Outcome: 13.4 ((95% CI: 13.3 to 13.4)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.90 (95% CI: 0.90 to 0.91)<br>Prevalence ratio: -1.5 (95% CI: -1.6 to -1.4), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup           | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)   | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|--------------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic White | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 966673        | Followup timepoint: NR<br>Outcome: 12.8 ((95% CI: 12.7 to 12.9)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic White | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 919697        | Followup timepoint: NR<br>Outcome: 12.4 ((95% CI: 12.3 to 12.4)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic White | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 841132        | Followup timepoint: NR<br>Outcome: 12.2 ((95% CI: 12.2 to 12.3)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic White | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 776843        | Followup timepoint: NR<br>Outcome: 12.1 ((95% CI: 12.0 to 12.2)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.95 (95% CI: 0.94 to 0.95)<br>Prevalence ratio: -0.7 (95% CI: -0.8 to -0.6), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup           | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)   | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|--------------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic Black | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 618580        | Followup timepoint: NR<br>Outcome: 12.7 ((95% CI: 12.6 to 12.8)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic Black | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 634965        | Followup timepoint: NR<br>Outcome: 12.1 ((95% CI: 12.0 to 12.2)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic Black | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 615395        | Followup timepoint: NR<br>Outcome: 11.9 ((95% CI: 11.8 to 11.9)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Non-Hispanic Black | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 594060        | Followup timepoint: NR<br>Outcome: 11.4 ((95% CI: 11.3 to 11.5)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.90 (95% CI: 0.89 to 0.91)<br>Prevalence ratio: -1.2 (95% CI: -1.3 to -1.1), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)  | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|----------|-------|-----------------------------|--|------|---------------|---|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Hispanic | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1536644       | Followup timepoint: NR<br>Outcome: 19.3<br>((95% CI: 19.2 to 19.3)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hispanic | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1513145       | Followup timepoint: NR<br>Outcome: 18.3<br>((95% CI: 18.2 to 18.3)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hispanic | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1389135       | Followup timepoint: NR<br>Outcome: 17.3<br>((95% CI: 17.3 to 17.4)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Hispanic | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 1274650       | Followup timepoint: NR<br>Outcome: 16.4<br>((95% CI: 16.4 to 16.5)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.86 (95% CI: 0.85 to 0.86)<br>Prevalence ratio: -2.8 (95% CI: -2.9 to -2.7), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup                      | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)   | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|-------------------------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | American Indian/Alaska Native | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 38661         | Followup timepoint: NR<br>Outcome: 20.9 ((95% CI: 20.5 to 21.3)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | American Indian/Alaska Native | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 40814         | Followup timepoint: NR<br>Outcome: 18.9 ((95% CI: 18.5 to 19.2)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | American Indian/Alaska Native | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 36456         | Followup timepoint: NR<br>Outcome: 18 ((95% CI: 17.6 to 18.3))   | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | American Indian/Alaska Native | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 35682         | Followup timepoint: NR<br>Outcome: 18.5 ((95% CI: 18.1 to 18.9)) | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.88 (95% CI: 0.86 to 0.91)<br>Prevalence ratio: -2.4 (95% CI: -3.0 to -1.9), p<0.001 | Age, sex, and race/ethnicity. |

| Author, Year                | Subgroup               | Arm   | Arm Name                    | Outcome Definition   | Tool | N At Analysis | Followup Outcome, N(%)   | Within-Group Difference | Between-Group Difference   | Adjusted Factors              |
|-----------------------------|------------------------|-------|-----------------------------|--|------|---------------|--|-------------------------|--|-------------------------------|
| Pan, 2016 <sup>73, 74</sup> | Asian/Pacific Islander | Arm 3 | 2010 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 121667        | Followup timepoint: NR<br>Outcome: 12.5 ((95% CI: 12.3 to 12.6)) | NR                      | Comparator : Ref   | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Asian/Pacific Islander | Arm 4 | 2012 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 130252        | Followup timepoint: NR<br>Outcome: 11.7 ((95% CI: 11.5 to 11.9)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Asian/Pacific Islander | Arm 5 | 2014 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 129770        | Followup timepoint: NR<br>Outcome: 11.1 ((95% CI: 10.9 to 11.3)) | NR                      | Comparator : NR  | Age, sex, and race/ethnicity. |
| Pan, 2016 <sup>73, 74</sup> | Asian/Pacific Islander | Arm 6 | 2016 Child WIC participants | Obesity (BMI at or above the 95th percentile for age and sex on the CDC growth charts) | NR   | 136141        | Followup timepoint: NR<br>Outcome: 10 ((95% CI: 9.9 to 10.2))    | NR                      | Comparator : Arm 3<br>Prevalence Difference: 0.81 (95% CI: 0.79 to 0.82)<br>Prevalence ratio: -2.4 (95% CI: -2.6 to -2.2), p<0.001 | Age, sex, and race/ethnicity. |

BMI=body mass index; CDC=Centers for Disease Control and Prevention; CI=confidence interval; n=sample size; NA=not available; NCHS=National Center for Health Statistics; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-174. Infant and child weight continuous outcomes (BMI percentile or z-score) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Sub-group      | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|--|---|
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3 | Arm 3 | Late dose (old package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3 | Arm 4 | Late dose (new package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: -0.014 (SE 0.062), p=0.817 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 3 | Late dose (old package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes  |

| Author, Year                 | Sub-group      | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|---|---|
|                              |                |       |                         |                    |      |                               |  |                         |   | for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group.  |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 4 | Late dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: - 0.109 (SE 0.044), p=0.013 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5 | Arm 3 | Late dose (old package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs,   |



| Author, Year                 | Sub-group       | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference                                      | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|---|---|
|                              |                 |       |                         |                    |      |                               |  |                         |   | as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group.   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5  | Arm 4 | Late dose (new package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: 0.037 (SE 0.06), p=0.54 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 3 | Late dose (old package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to                               |

| Author, Year                 | Sub-group       | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|--|---|
|                              |                 |       |                         |                    |      |                               |  |                         |  | depend on WIC exposure group.   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 4 | Late dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: 0.023 (SE 0.061), p=0.7    | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 3 | Late dose (old package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 4 | Late dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: -0.045 (SE 0.039), p=0.242 | Models included a random intercept and random slopes  |

| Author, Year                 | Sub-group       | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|--|---|
|                              |                 |       |                         |                    |      |                               |  |                         |  | for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group.  |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 3 | Late dose (old package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 4 | Late dose (new package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Slope difference: -0.065 (SE 0.052), p=0.215 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs,   |

| Author, Year                 | Sub-group      | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|---|---|
|                              |                |       |                         |                    |      |                               |  |                         |   | as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group.   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3 | Arm 4 | Late dose (new package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 2-3 | Arm 2 | Full dose (new package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: 0.024 (SE 0.062), p=0.702 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to                               |

| Author, Year                 | Sub-group      | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|---|---|
|                              |                |       |                         |                    |      |                               |  |                         |   | depend on WIC exposure group.   |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 4 | Late dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 3-4 | Arm 2 | Full dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: 0.066 (SE 0.049), p=0.178 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5 | Arm 4 | Late dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes  |

| Author, Year                 | Sub-group       | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|---|---|
|                              |                 |       |                         |                    |      |                               |  |                         |   | for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group.  |
| Chaparro, 2019 <sup>57</sup> | Boys, Age: 4-5  | Arm 2 | Full dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: - 0.029 (SE 0.087), p=0.737 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 4 | Late dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs,   |

| Author, Year                 | Sub-group       | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|---|---|
|                              |                 |       |                         |                    |      |                               |  |                         |   | as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group.   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 2-3 | Arm 2 | Full dose (new package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: 0.012 (SE 0.854), p=0.854 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 4 | Late dose (new package) | BMIZ               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to                               |

| Author, Year                 | Sub-group       | Arm   | Arm Name                | Outcome Definition | Tool | N                             | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|-----------------|-------|-------------------------|--------------------|------|-------------------------------|--|-------------------------|--|---|
|                              |                 |       |                         |                    |      |                               |  |                         |  | depend on WIC exposure group.   |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 3-4 | Arm 2 | Full dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: -0.019 (SE 0.669), p=0.669 | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC Exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 4 | Late dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Models included a random intercept and random slopes for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Chaparro, 2019 <sup>57</sup> | Girls, Age: 4-5 | Arm 2 | Full dose (new package) | BMIz               | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm4<br>Slope difference: 0.1072 (SE 0.176), p=0.176 | Models included a random intercept and random slopes  |



| Author, Year              | Sub-group | Arm   | Arm Name  | Outcome Definition   | Tool                  | N                             | Followup Outcome  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|-----------|-------|-----------|--|-----------------------|-------------------------------|---|-------------------------|--|--|
|                           |           |       |           |  |                       |                               |   |                         |  | for each age interval for each subject, and random intercepts for matched pairs, as well as interactions that allowed the mean slope in each interval to depend on WIC exposure group. |
| Daepp, 2019 <sup>63</sup> | 0         | Arm 1 | pre-2009  | annual trend state level obesity prevalence (prior to 2009), defined as % of 2-4 year olds in state enrolled in WIC who are obese by CDC, sex-specific BMI percentile $\geq 95$ th | CDC 2000 Growth Chart | Baseline: NR<br>Followup : NR | Followup timepoint: End of pre-period (2009)<br>Baseline: NR<br>Followup: Mean: 0.23 (95% CI: 0.17 to 0.29) | NR                      | Comparator: Ref  | NR   |
| Daepp, 2019 <sup>63</sup> | 0         | Arm 2 | post-2009 | annual trend in state level obesity prevalence post 2009, defined as   | CDC 2000 Growth Chart | Baseline: NR<br>Followup : NR | Followup timepoint: End of post-period (2014)<br>Baseline: NR<br>Followup: Mean: -0.34                      | NR                      | Comparator: Arm 1<br>Not reported: -0.57 (95% CI: -0.69 to -0.44), p=0.001 | Child race and ethnicity, % children in state in poverty, state fixed and random effects   |

| Author,<br>Year | Sub-<br>group | Arm | Arm<br>Name | Outcome<br>Definition   | Tool | N | Followup<br>Outcome         | Within-<br>group<br>Difference | Between-group<br>Difference | Adjusted<br>Factors |
|-----------------|---------------|-----|-------------|---|------|---|-----------------------------|--------------------------------|-----------------------------|---------------------|
|                 |               |     |             | % of 2-4<br>year olds<br>in state<br>enrolled in<br>WIC who<br>are obese<br>by CDC,<br>sex-<br>specific<br>BMI<br>percentile<br>≥95th |      |   | (95% CI: -0.42<br>to -0.25) |                                |                             |                     |

BMI=body mass index; CDC=Centers for Disease Control and Prevention; CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-175. Infant and child weight categorical outcomes (recovery from malnutrition) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year             | Sub-group | Arm   | Arm Name                       | Outcome Definition                               | Tool          | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference                                       | Adjusted Factors                          |
|--------------------------|-----------|-------|--------------------------------|--|---------------|---------------|--|-------------------------|--|---|
| Smock,2020 <sup>43</sup> | NR        | Arm 1 | 2-4 number WIC visits, overall | % Recovered from low-weight-forage, not adjusted | anthropometry | NR            | Followup timepoint: visit to WIC between January 1998 - September 2010<br>Outcome: 25 (68) | NR                      | Comparator: ref  | NR  |
| Smock,2020 <sup>43</sup> | NR        | Arm 2 | 5+ number WIC visits, overall  | % Recovered from low-weight-forage, not adjusted | anthropometry | NR            | Followup timepoint: visit to WIC between January 1998 - September 2010<br>Outcome: 33 (92) | NR                      | Comparator: Arm1<br>OR: 5.28 (95% CI: 1.35-20.73 ),<br>p=0.017 | NR  |
| Smock,2020 <sup>43</sup> | NR        | Arm 1 | 2-4 number WIC visits, overall | % Recovered from low-weight-forage, adjusted     | anthropometry | NR            | Followup timepoint: visit to WIC between January 1998 - September 2010<br>Outcome: 25 (68) | NR                      | Comparator: ref  | NR  |
| Smock,2020 <sup>43</sup> | NR        | Arm 2 | 5+ number WIC visits, overall  | % Recovered from low-weight-forage, adjusted     | anthropometry | NR            | Followup timepoint: visit to WIC between January 1998 - September 2010                     | NR                      | Comparator: Arm1<br>OR: 1.73 (95% CI: 0.31-9.76 ),<br>p<0.537  | WAZ was adjusted for child sex and anemia |

| Author, Year             | Sub-group | Arm   | Arm Name                       | Outcome Definition                               | Tool          | N at Analysis  | Followup Outcome, n(%) | Within-group Difference                                   | Between-group Difference | Adjusted Factors   |
|--------------------------|-----------|-------|--------------------------------|--|---------------|--|------------------------|---|--------------------------|--|
|                          |           |       |                                |  |               |  | Outcome: 33 (92)       |   |                          |  |
| Smock,2020 <sup>43</sup> | NR        | Arm 1 | 2-4 number WIC visits, overall | % Recovered from low-height-forage, not adjusted | anthropometry | Followup timepoint : visit to WIC between January 1998 - September 2010<br>Outcome : 22 (59) | NR                     | Comparator : Ref  | NR                       | data were collected between 1998 - 2010 - little data before 2009 but I included because rare use of refuge population |
| Smock,2020 <sup>43</sup> | NR        | Arm 2 | 5+ number WIC visits, overall  | % Recovered from low-height-forage, not adjusted | anthropometry | Followup timepoint : visit to WIC between January 1998 - September 2010<br>Outcome : 38 (93) | NR                     | Comparator : 2<br>OR: 8.64 (95% CI: 2.25-33.19 ), p=0.002 | NR                       | data were collected between 1998 - 2010 - little data before 2009 but I included because rare use of refuge population |
| Smock,2020 <sup>43</sup> | NR        | Arm 1 | 2-4 number WIC visits, overall | % Recovered from low-height-forage, adjusted     | anthropometry | Followup timepoint : visit to WIC between January 1998 - September 2010<br>Outcome : 22 (59) | NR                     | Comparator : Ref  | NR                       | NR   |
| Smock,2020 <sup>43</sup> | NR        | Arm 2 | 5+ number WIC visits, overall  | % Recovered from low-height-forage, adjusted     | anthropometry | Followup timepoint : visit to WIC between  | NR                     | Comparator : 2<br>OR: 12.12 (95% CI:                      | child sex                | NR   |

| Author, Year | Sub-group | Arm | Arm Name | Outcome Definition | Tool | N at Analysis                                   | Followup Outcome, n(%) | Within-group Difference | Between-group Difference | Adjusted Factors |
|--------------|-----------|-----|----------|--------------------|------|---|------------------------|-------------------------|--------------------------|------------------|
|              |           |     |          |                    |      | January 1998 - September 2010 Outcome : 38 (93) |                        | 2.82-52.04), p<0.001    |                          |                  |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-176. Breastfeeding initiation categorical outcomes of studies investigating the association between breastfeeding outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Subgroup | Arm   | Arm Name | Outcome Definition                           | Tool | N at Analysis | Followup Outcome, n(%)                          | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|----------|-------|----------|--|------|---------------|---|-------------------------|---|--|
| Bersak, 2021 <sup>3</sup> | No       | Arm 1 | Non-WIC  | breastfeeding occurred at hospital discharge | NR   | 49018         | Followup: Hospital discharge Outcome: NR (55)   | NR                      | Comparator: Ref   | Child's gender, mother's age, race, education, first trimester prenatal care, smoking, diabetes, hypertension, previous poor birth outcome, previous cesarean, previous preterm birth, month of birth fixed effects, gestation, and maternal BMI |
| Bersak, 2021 <sup>3</sup> | No       | Arm 2 | WIC      | breastfeeding occurred at hospital discharge | NR   | 205132        | Followup: Hospital discharge Outcome: NR (48.6) | NR                      | Comparator: Non-WIC % difference from baseline: 0.0046 (SE: 0.0091), p=ns | Child's gender, mother's age, race, education, first trimester prenatal care, smoking, diabetes, hypertension, previous poor birth outcome, previous cesarean, previous preterm birth, month of birth fixed effects, gestation, and maternal BMI |

| Author, Year           | Subgroup | Arm   | Arm Name                              | Outcome Definition       | Tool  | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference                                   | Adjusted Factors  |
|------------------------|----------|-------|---------------------------------------|--------------------------|---|---------------|---|-------------------------|--|---|
| Ma, 2014 <sup>10</sup> | No       | Arm 1 | Income-eligible, non-WIC Participants | Breastfeeding initiation | "Did you ever breastfeed or pump breast milk to feed your new baby after delivery?" | 214           | Followup timepoint: Mean (SD): 14.81 (0.15) weeks<br>Outcome: NR (78.9) | NR                      | Comparator: 2 vs. 1<br>OR: 3 (95% CI: 1.55, 5.80), p=0.001 | Maternal race, age, trying to get pregnant, maternal education, marital status, infant gender, maternal smoking during last 3 months of pregnancy, maternal drinking during last 3 months of pregnancy, previous live birth, breastfeeding education/information received during pregnancy, low birthweight, preterm birth, initiation of prenatal care, gestational diabetes, gestational hypertension |

| Author, Year                        | Subgroup | Arm   | Arm Name   | Outcome Definition       | Tool  | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------------|----------|-------|--|--------------------------|---|---------------|---|-------------------------|--|---|
| Ma, 2014 <sup>10</sup>              | No       | Arm 2 | WIC Participants                                 | Breastfeeding initiation | "Did you ever breastfeed or pump breast milk to feed your new baby after delivery?" | 1024          | Followup timepoint: Mean (SD): 14.81 (0.15) weeks<br>Outcome: NR (55.5) | NR                      | Comparator: 2 vs. 1<br>OR: 2.61 (95% CI: 1.06, 4.34), p=0.035        | Maternal race, age, trying to get pregnant, maternal education, marital status, infant gender, maternal smoking during last 3 months of pregnancy, maternal drinking during last 3 months of pregnancy, previous live birth, breastfeeding education/information received during pregnancy, low birthweight, preterm birth, initiation of prenatal care, gestational diabetes, gestational hypertension |
| McCoy, 2018 (Study A) <sup>11</sup> | No       | Arm 1 | Not assigned a peer prenatally (reference group) | Ever breastfed           | NA  | 345           | Followup timepoint: NA<br>Outcome: 281 (81)                             | NR                      | Comparator: All p<0.0001   | NA  |
| McCoy, 2018 (Study A) <sup>11</sup> | No       | Arm 2 | Assigned a peer, but no prenatal services        | Ever breastfed           | NA  | 733           | Followup timepoint: NA<br>Outcome: 610 (83)                             | NR                      | Comparator: Arm 3 vs. Arm 1<br>OR: 1.81 (95% CI: 1.30 to 2.50), p=NR | NA  |



| Author, Year                        | Subgroup | Arm   | Arm Name                                       | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-------------------------------------|----------|-------|--|--------------------|------|---------------|--|-------------------------|--|------------------|
| McCoy, 2018 (Study A) <sup>11</sup> | No       | Arm 3 | Assigned a peer and received prenatal services | Ever breastfed     | NA   | 1141          | Followup timepoint: NA<br>Outcome: 1011 (89) | NR                      | Comparator: Arm 2 vs. Arm 1<br>OR: 1.15 (95% CI: 0.83 to 1.61), p=NR | NA               |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-177. Breastfeeding initiation categorical outcomes of studies investigating the association of the 2009 food package change with breastfeeding outcomes**

| Author, Year            | Subgroup | Arm   | Arm Name          | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)                          | Within-group Difference | Between-group Difference    | Adjusted Factors |
|-------------------------|----------|-------|-------------------|--|---|---------------|---|-------------------------|-----------------------------|------------------|
| Lee, 2017 <sup>69</sup> | NR       | Arm 1 | 2002 Birth Cohort | Was [the child] ever breastfed or fed breastmilk? Y/N      | NA  | 122852        | Followup timepoint: NR<br>Outcome: NR (62)      | NR                      | Comparator: NR              | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 2 | 2010 Birth Cohort | Was [the child] ever breastfed or fed breastmilk? Y/N      | NA  | 125779        | Followup timepoint: NR<br>Outcome: NR (76.9)    | NR                      | Comparator: NR              | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 3 | 2015 Birth Cohort | Was [the child] ever breastfed or fed breastmilk? Y/N      | NA  | 113806        | Followup timepoint: NR<br>Outcome: NR (83.4)    | NR                      | Comparator: NR              | NR               |
| Lee, 2017 <sup>69</sup> | NR       | 0     | 2002-2015         | Annual Percentage Change (APC) in breastfeeding initiation | Fixed annual percentage change in breastfeeding initiation from 2002-2015 | NR            | Followup timepoint: 2002-2015<br>Outcome: NR    | NR                      | Comparator: NR: 2.4, p<0.05 | NR               |
| Lee, 2017 <sup>69</sup> | Hispanic | Arm 1 | 2002 Birth Cohort | Breastfeeding initiation for $\geq 1$ month                | NR  | NR            | Followup timepoint: 2002<br>Outcome: NR (72.37) | NR                      | Comparator: NR              | NR               |
| Lee, 2017 <sup>69</sup> | Hispanic | Arm 2 | 2010 Birth Cohort | Breastfeeding initiation for $\geq 1$ month                | NR  | NR            | Followup timepoint: 2010<br>Outcome: NR (85.93) | NR                      | Comparator: NR              | NR               |
| Lee, 2017 <sup>69</sup> | Hispanic | Arm 3 | 2015 Birth Cohort | Breastfeeding initiation for $\geq 1$ month                | NR  | NR            | Followup timepoint: 2015<br>Outcome: NR (88.31) | NR                      | Comparator: NR              | NR               |

| Author, Year            | Subgroup | Arm   | Arm Name          | Outcome Definition                          | Tool | N at Analysis | Followup Outcome, n(%)                          | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------|----------|-------|-------------------|---|------|---------------|---|-------------------------|--------------------------|------------------|
| Lee, 2017 <sup>69</sup> | White    | Arm 1 | 2002 Birth Cohort | Breastfeeding initiation for $\geq 1$ month | NR   | NR            | Followup timepoint: 2002<br>Outcome: NR (58.32) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | White    | Arm 2 | 2010 Birth Cohort | Breastfeeding initiation for $\geq 1$ month | NR   | NR            | Followup timepoint: 2010<br>Outcome: NR (78.76) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | White    | Arm 3 | 2015 Birth Cohort | Breastfeeding initiation for $\geq 1$ month | NR   | NR            | Followup timepoint: 2015<br>Outcome: NR (81.86) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | Black    | Arm 1 | 2002 Birth Cohort | Breastfeeding initiation for $\geq 1$ month | NR   | NR            | Followup timepoint: 2002<br>Outcome: NR (56.42) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | Black    | Arm 2 | 2010 Birth Cohort | Breastfeeding initiation for $\geq 1$ month | NR   | NR            | Followup timepoint: 2010<br>Outcome: NR (74.07) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | Black    | Arm 3 | 2015 Birth Cohort | Breastfeeding initiation for $\geq 1$ month | NR   | NR            | Followup timepoint: 2015<br>Outcome: NR (79.23) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | Asian    | Arm 1 | 2002 Birth Cohort | Breastfeeding initiation for $\geq 1$ month | NR   | NR            | Followup timepoint: 2002<br>Outcome: NR (45.88) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | Asian    | Arm 2 | 2010 Birth Cohort | Breastfeeding initiation for $\geq 1$ month | NR   | NR            | Followup timepoint: 2010<br>Outcome: NR (68.8)  | NR                      | Comparator: NR           | NR               |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition   | Tool                    | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|--|-------------------------|---------------|---|-------------------------|--------------------------|--|
| Lee, 2017 <sup>69</sup>   | Asian    | Arm 3 | 2015 Birth Cohort                                     | Breastfeeding initiation for $\geq 1$ month                                  | NR                      | NR            | Followup timepoint: 2015<br>Outcome: NR (82.89)                   | NR                      | Comparator: NR           | NR   |
| Wilde, 2012 <sup>78</sup> | NR       | Arm 1 | Pre-implementation (3 months before new food package) | Infant ever breastfed as reported by mother at WIC certification appointment | Ever breastfed (Yes/No) | 80658         | Followup timepoint: Month 2 of study period<br>Outcome: NR (65.5) | NR                      | Comparator: p=ns         | Household income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition   | Tool                    | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|--|-------------------------|---------------|--|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 2 | Post-implementation (8 months after new food package) | Infant ever breastfed as reported by mother at WIC certification appointment | Ever breastfed (Yes/No) | 77534         | Followup timepoint: Month 10 of study period<br>Outcome: NR (65.1) | NR                      | Comparator: NR           | Household income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition   | Tool                                  | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|--|---------------------------------------|---------------|---|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 1 | Pre-implementation (3 months before new food package) | Infant ever breastfed as reported by mother at WIC certification appointment | Receipt of Full Breastfeeding Package | 80658         | Followup timepoint: Month 2 of study period<br>Outcome: NR (99.6) | NR                      | Comparator: p=0.035      | Household income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition   | Tool                                  | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|--|---------------------------------------|---------------|--|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 2 | Post-implementation (8 months after new food package) | Infant ever breastfed as reported by mother at WIC certification appointment | Receipt of Full Breastfeeding Package | 77534         | Followup timepoint: Month 10 of study period<br>Outcome: NR (99.3) | NR                      | Comparator: NR           | Household income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-178. Breastfeeding initiation categorical outcomes (ever breastfed) of studies investigating the association between breastfeeding outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Sub-group                            | Arm   | Arm Name             | Outcome Definition   | Tool | N at analysis | Followup Outcome, n(%)                       | Within-group difference    | Between-group Difference | Adjusted Factors |
|------------------------|--------------------------------------|-------|----------------------|--|------|---------------|--|----------------------------|--------------------------|------------------|
| Li, 2019 <sup>37</sup> | Eligible Participants (unmatched)    | Arm 1 | Birth Year 2000-2008 | Ever-breastfed was determined by a question asking respondents, "Was the child ever breastfed or fed breast milk?" Response options included "Yes" and "No". | NR   | NR            | Followup timepoint: NR<br>Outcome: NR (0.63) | NR                         | Comparator: NR           | NR               |
| Li, 2019 <sup>37</sup> | Eligible Nonparticipants (unmatched) | Arm 1 | Birth Year 2000-2008 | Ever-breastfed was determined by a question asking respondents, "Was the child ever breastfed or fed breast milk?" Response options included "Yes" and "No". | NR   | NR            | Followup timepoint: NR<br>Outcome: NR (0.74) | NR                         | Comparator: NR           | NR               |
| Li, 2019 <sup>37</sup> | Eligible Participants (unmatched)    | Arm 2 | Birth Year 2009-2014 | Ever-breastfed was determined by a question asking respondents, "Was the child ever breastfed or fed breast milk?" Response options included "Yes" and "No". | NR   | NR            | Followup timepoint: NR<br>Outcome: NR (0.69) | -0.07 (SE 0.04),<br>p<0.05 | Comparator: NR           | NR               |



| Author, Year           | Sub-group                            | Arm   | Arm Name             | Outcome Definition  | Tool | N at analysis | Followup Outcome, n(%)                       | Within-group difference | Between-group Difference | Adjusted Factors |
|------------------------|--------------------------------------|-------|----------------------|---|------|---------------|--|-------------------------|--------------------------|------------------|
| Li, 2019 <sup>37</sup> | Eligible Nonparticipants (unmatched) | Arm 2 | Birth Year 2009-2014 | Ever-breastfed was determined by a question asking respondents, "Was the child ever breastfed or fedbreast milk?" Response options included "Yes" and "No". | NR   | NR            | Followup timepoint: NR<br>Outcome: NR (0.76) | NR                      | Comparator: NR           | NR               |

|                        |                                 |       |                      |   |    |    |  |                            |                |  |
|------------------------|---------------------------------|-------|----------------------|---|----|----|--|----------------------------|----------------|--|
| Li, 2019 <sup>37</sup> | Eligible Participants (matched) | Arm 1 | Birth Year 2000-2008 | Ever breastfed-Matched treatment effect | NR | NR | Followup timepoint: NR<br>Outcome: NR (0.66) | -0.08 (SE 0.03),<br>p<0.05 | Comparator: NR | Variables used to estimate propensity scores included several key demographic characteristics of the child: age in months, gender (male and female), and race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, other Hispanics, and other race). Additional variables pertained to the child's family characteristics: marital status (married/living with partner, widowed/divorced/separated, and never married), educational attainment of the household reference person (less than high school, high school graduate, some college, and college graduate or higher), as well as household income to poverty ratio, which was defined as the household income divided by the applicable federal poverty line. We also included information about whether the household had ever received food stamps in the analyses |
|------------------------|---------------------------------|-------|----------------------|---|----|----|--|----------------------------|----------------|--|

|                        |                                    |       |                      |   |    |    |  |    |                |  |
|------------------------|------------------------------------|-------|----------------------|---|----|----|--|----|----------------|--|
| Li, 2019 <sup>37</sup> | Eligible Nonparticipants (matched) | Arm 1 | Birth Year 2000-2008 | Ever breastfed-Matched treatment effect | NR | NR | Followup timepoint: NR<br>Outcome: NR (0.74) | NR | Comparator: NR | Variables used to estimate propensity scores included several key demographic characteristics of the child: age in months, gender (male and female), and race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, other Hispanics, and other race). Additional variables pertained to the child's family characteristics: marital status (married/living with partner, widowed/divorced/separated, and never married), educational attainment of the household reference person (less than high school, high school graduate, some college, and college graduate or higher), as well as household income to poverty ratio, which was defined as the household income divided by the applicable federal poverty line. We also included information about whether the household had ever received food stamps in the analyses |
|------------------------|------------------------------------|-------|----------------------|---|----|----|--|----|----------------|--|

|                        |                                   |       |                      |   |    |    |  |                      |                |  |
|------------------------|-----------------------------------|-------|----------------------|---|----|----|--|----------------------|----------------|--|
| Li, 2019 <sup>37</sup> | Eligible Participants (unmatched) | Arm 2 | Birth Year 2009-2014 | Ever breastfed-Matched treatment effect | NR | NR | Followup timepoint: NR<br>Outcome: NR (0.69) | -0.04 (SE 0.05), pns | Comparator: NR | Variables used to estimate propensity scores included several key demographic characteristics of the child: age in months, gender (male and female), and race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, other Hispanics, and other race). Additional variables pertained to the child's family characteristics: marital status (married/living with partner, widowed/divorced/separated, and never married), educational attainment of the household reference person (less than high school, high school graduate, some college, and college graduate or higher), as well as household income to poverty ratio, which was defined as the household income divided by the applicable federal poverty line. We also included information about whether the household had ever received food stamps in the analyses |
|------------------------|-----------------------------------|-------|----------------------|---|----|----|--|----------------------|----------------|--|

|                        |                                    |       |                      |   |    |    |  |    |                |  |
|------------------------|------------------------------------|-------|----------------------|---|----|----|--|----|----------------|--|
| Li, 2019 <sup>37</sup> | Eligible Nonparticipants (matched) | Arm 2 | Birth Year 2009-2014 | Ever breastfed-Matched treatment effect | NR | NR | Followup timepoint: NR<br>Outcome: NR (0.73) | NR | Comparator: NR | Variables used to estimate propensity scores included several key demographic characteristics of the child: age in months, gender (male and female), and race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, other Hispanics, and other race). Additional variables pertained to the child's family characteristics: marital status (married/living with partner, widowed/divorced/separated, and never married), educational attainment of the household reference person (less than high school, high school graduate, some college, and college graduate or higher), as well as household income to poverty ratio, which was defined as the household income divided by the applicable federal poverty line. We also included information about whether the household had ever received food stamps in the analyses |
|------------------------|------------------------------------|-------|----------------------|---|----|----|--|----|----------------|--|

| Author, Year              | Sub-group | Arm   | Arm Name                                | Outcome Definition                             | Tool   | N at analysis | Followup Outcome, n(%) | Within-group difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|-----------|-------|---|--|--|---------------|------------------------|-------------------------|--|--|
| Zhang, 2021 <sup>17</sup> | NR        | Arm 1 | WIC Eligible Participating Children     | Was the child ever breastfed or fed breastmilk | Coeff. of WIC participation on Breastfeeding with model using IV: SNAP+ SNAP2+S NAP policy index for WIC-eligible Population (Income <=185 of the FPL) | 71757         | NR                     | NR                      | Comparator: WIC Eligible Non-participating Not reported: -0.039(SE: 0.322), p=ns | state dummy, sex, race/ethnicity, education, child's age, maternal age, maternal marital status, number of people in the household, interview language, birth year, TANF/Temporary Assistance for Needy Families enrollment rate (# of enrolled participants/# of state population), CHIP/Children's Health Insurance, Program enrollment rate (# of enrolled children/# of children 18 or under in the state), and state unemployment rate. |
| Zhang, 2021 <sup>17</sup> | NR        | Arm 2 | WIC Eligible Non-Participating Children | Was the child ever breastfed or fed breastmilk | Coeff. of WIC participation on Breastfeeding with model using IV: SNAP+ SNAP2+S NAP policy index for WIC-eligible Population (Income <=185 of the FPL) | 20578         | NR                     | NR                      | Comparator: Ref  | state dummy, sex, race/ethnicity, education, child's age, maternal age, maternal marital status, number of people in the household, interview language, birth year, TANF/Temporary Assistance for Needy Families enrollment rate (# of enrolled participants/# of state population), CHIP/Children's Health Insurance, Program enrollment rate (# of enrolled children/# of children 18 or under in the state), and state unemployment rate. |

| Author, Year              | Sub-group | Arm   | Arm Name                                | Outcome Definition                             | Tool   | N at analysis | Followup Outcome, n(%) | Within-group difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|---|--|--|---------------|------------------------|-------------------------|---|--|
| Zhang, 2021 <sup>17</sup> | NR        | Arm 1 | WIC Eligible Participating Children     | Was the child ever breastfed or fed breastmilk | Coeff. of WIC participation on Breastfeeding with model using IV: SNAP+ SNAP2+S NAP policy index for WIC-eligible Population (Income <=230 of the FPL) | 71757         | NR                     | NR                      | Comparator: WIC Eligible Non-participating Not reported: 0.085(SE: 0.298), p=NR | state dummy, sex, race/ethnicity, education, child's age, maternal age, maternal marital status, number of people in the household, interview language, birth year, TANF/Temporary Assistance for Needy Families enrollment rate (# of enrolled participants/# of state population), CHIP/Children's Health Insurance, Program enrollment rate (# of enrolled children/# of children 18 or under in the state), and state unemployment rate. |
| Zhang, 2021 <sup>17</sup> | NR        | Arm 2 | WIC Eligible Non-Participating Children | Was the child ever breastfed or fed breastmilk | Coeff. of WIC participation on Breastfeeding with model using IV: SNAP+ SNAP2+S NAP policy index for WIC-eligible Population (Income <=230 of the FPL) | 20578         | NR                     | NR                      | Comparator: Ref   | state dummy, sex, race/ethnicity, education, child's age, maternal age, maternal marital status, number of people in the household, interview language, birth year, TANF/Temporary Assistance for Needy Families enrollment rate (# of enrolled participants/# of state population), CHIP/Children's Health Insurance, Program enrollment rate (# of enrolled children/# of children 18 or under in the state), and state unemployment rate. |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; PedNSS=New York Pediatric Nutrition Surveillance System; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-179. Breastfeeding initiation categorical outcomes (ever breastfed) of studies investigating the association of the 2009 food package change with breastfeeding outcomes**

| Author, Year                   | Sub-group                        | Arm   | Arm Name                | Outcome Definition  | Tool | N at analysis | Followup Outcome , n(%)                                  | Within-group difference                             | Between-group Difference  | Adjusted Factors   |
|--------------------------------|----------------------------------|-------|-------------------------|---|------|---------------|--|---|---------------------------|--|
| Joyce, 2015 <sup>67</sup>      | WIC vs Eligible Non-participants | Arm 1 | PRAMS 2010 vs 2004-2007 | Difference in Proportion Ever Breastfed 2010 vs 2004-2007 WIC vs Eligible non-participant | NR   | 12747         | Followup timepoint: 2-6 months postpartum<br>Outcome: NR | Mean change from baseline: 0.028 (SE 0.011), p<0.05 | Comparator: NR            | age, race/ethnicity, marital status, income, insurance (Medicaid or not), state and year, whether mother received WIC benefits |
| Joyce, 2015 <sup>67</sup>      | WIC vs Eligible Non-participants | Arm 2 | NIS 2010 vs 2004-2007   | Difference in Proportion Ever Breastfed 2010 vs 2004-2007 WIC vs Eligible non-participant | NR   | 73991         | Followup timepoint: 19-35 months of age<br>Outcome: NR   | Mean change from baseline: -0.008 (SE 0.022), pns   | Comparator: NR            | age, race/ethnicity, marital status, income, insurance (Medicaid or not), state and year, whether mother received WIC benefits |
| Joyce, 2015 <sup>67</sup>      | Pre vs Post food package month   | Arm 3 | PedNSS 2011 vs 2007     | Difference in proportion of infants ever breastfed  | NR   | 744           | Followup timepoint: NR<br>Outcome: NR                    | Mean change from baseline: -0.001 (SE 0.004), pns   | Comparator: NR            | month and state  |
| Langellier, 2014 <sup>68</sup> | NR                               | Arm 1 | 2005 survey year        | Ever breastfed  | NR   | 1772          | Followup timepoint: 2005<br>Outcome: NR (86.7)           | NR  | Comparator: NR<br>p<0.001 | NR   |
| Langellier, 2014 <sup>68</sup> | NR                               | Arm 1 | 2008 survey year        | Ever breastfed  | NR   | 1598          | Followup timepoint: 2008<br>Outcome: NR (87.2)           | NR  | Comparator: NR            | NR   |
| Langellier, 2014 <sup>68</sup> | NR                               | Arm 2 | 2011 survey year        | Ever breastfed  | NR   | 1650          | Followup timepoint: 2011<br>Outcome: NR (93)             | NR  | Comparator: NR            | NR   |

| Author, Year                  | Sub-group                            | Arm      | Arm Name                       | Outcome Definition     | Tool | N at analysis | Followup Outcome, n(%)                | Within-group difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|--------------------------------------|----------|--------------------------------|------------------------|------|---------------|---------------------------------------|-------------------------|--|---|
| Langelier, 2014 <sup>68</sup> | New food package vs old food package | Over all | 2011 vs 2005&2008 survey years | Odds of Ever Breastfed | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 2 vs Arm 1<br>OR: 2.16 (95% CI: 1.69, 2.76), p<0.001 | child age, child gender, maternal age, education, race/ethnicity, nativity status, interview language. Household size, father living in household, number of years mother in WIC, intention to bf, formula discharge, pack at hospital, in-hospital breastfeeding |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; PedNSS=New York Pediatric Nutrition Surveillance System; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-180. Breastfeeding initiation continuous outcomes of studies investigating the association between breastfeeding outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Sub-group                                      | Arm   | Arm Name      | Outcome Definition  | Tool | N   | Followup Outcome   | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|-----------------------------|--|-------|---------------|---|------|---|--|-------------------------|--|--|
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity)                   | Arm 1 | White Non-WIC | Breastfeeding initiation                                  | NR   | Baseline: NR<br>Followup: 34560 observations  | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Maternal age dummies and year of birth fixed effects       |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity)                   | Arm 2 | White WIC     | Breastfeeding initiation                                  | NR   | Baseline: NR<br>Followup: 106067 observations | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Probability of breastfeeding (% points): 0.0012 (SE 0.0056), p=0.834 | Maternal age dummies and year of birth fixed effects       |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity)                   | Arm 3 | Black Non-WIC | Breastfeeding initiation                                  | NR   | Baseline: NR<br>Followup: 20793 observations  | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Maternal age dummies and year of birth fixed effects       |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity)                   | Arm 4 | Black WIC     | Breastfeeding initiation                                  | NR   | Baseline: NR<br>Followup: 109676 observations | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Probability of breastfeeding (% points): 0.0276 (SE 0.0057), p=0     | Maternal age dummies and year of birth fixed effects       |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity), Medicaid mothers | Arm 1 | White Non-WIC | Breastfeeding initiation (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: 34560 observations  | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | Maternal age dummies, race and year of birth fixed effects |

| Author, Year                | Sub-group  | Arm   | Arm Name      | Outcome Definition  | Tool | N   | Followup Outcome   | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-----------------------------|--|-------|---------------|---|------|---|--|-------------------------|---|--|
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity), Medicaid mothers   | Arm 2 | White WIC     | Breastfeeding initiation (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: 106067 observations           | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Probability of breastfeeding (% points): -0.0572 (SE 0.0031), p≤0.001 | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity), Medicaid mothers   | Arm 3 | Black Non-WIC | Breastfeeding initiation (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: 20793 observations            | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity), Medicaid mothers   | Arm 4 | Black WIC     | Breastfeeding initiation (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: 109676 observations           | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Probability of breastfeeding (% points): -0.0358 (SE 0.0039), p≤0.001 | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity), discordant mothers | Arm 1 | White Non-WIC | Breastfeeding initiation (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: Arm1+Arm2=1 9537 observations | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | White (unclear on ethnicity), discordant mothers | Arm 2 | White WIC     | Breastfeeding initiation (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: Arm1+Arm2=1 9537 observations | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm1<br>Probability of breastfeeding (% points): -0.000 (SE 0.0061), p=NS     | Maternal age dummies, race and year of birth fixed effects |

| Author, Year                | Sub-group  | Arm   | Arm Name      | Outcome Definition  | Tool | N   | Followup Outcome   | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-----------------------------|--|-------|---------------|---|------|---|--|-------------------------|---|--|
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity), discordant mothers | Arm 3 | Black Non-WIC | Breastfeeding initiation (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: Arm3+Arm4=2 1226 observations | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref   | Maternal age dummies, race and year of birth fixed effects |
| Sonchak, 2017 <sup>14</sup> | Black (unclear on ethnicity), discordant mothers | Arm 4 | Black WIC     | Breastfeeding initiation (Ordinary Least Squared results) | NR   | Baseline: NR<br>Followup: Arm3+Arm4=2 1226 observations | Followup timepoint: At hospital discharge<br>Outcome: Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm3<br>Probability of breastfeeding (% points): 0.215 (SE 0.0062), p≤0.001 | Maternal age dummies, race and year of birth fixed effects |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-181. Breastfeeding duration categorical outcomes of studies investigating the association between breastfeeding outcomes and WIC participation compared with eligible non-participants**

| Author, Year           | Subgroup | Arm   | Arm Name                              | Outcome Definition | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference                                      | Adjusted Factors  |
|------------------------|----------|-------|---------------------------------------|--------------------|---------------|---|-------------------------|---|---|
| Ma, 2014 <sup>10</sup> | No       | Arm 1 | Income-eligible, non-WIC participants | Time-to-weaning    | NR            | Followup timepoint: Mean (SD): 14.81 (0.15) weeks Outcome: NA | NR                      | Comparator: 2 vs. 1<br>RR: 0.56 (95% CI: 0.36, 0.85), p=0.007 | Maternal race, age, trying to get pregnant, maternal education, marital status, infant gender, maternal smoking during last 3 months of pregnancy, maternal drinking during last 3 months of pregnancy, previous live birth, breastfeeding education/information received during pregnancy, low birthweight, preterm birth, initiation of prenatal care, gestational diabetes, gestational hypertension |
| Ma, 2014 <sup>10</sup> | No       | Arm 2 | WIC Participants                      | Time-to-weaning    | NR            | Followup timepoint: Mean (SD): 14.81 (0.15) weeks Outcome: NA | NR                      | Comparator: 2 vs. 1<br>RR: 0.66 (95% CI: 0.41, 1.05), p=0.08  | Maternal race, age, trying to get pregnant, maternal education, marital status, infant gender, maternal smoking during last 3 months of pregnancy, maternal drinking during last 3 months of pregnancy, previous live birth, breastfeeding education/information received during pregnancy, low birthweight, preterm birth, initiation of prenatal care, gestational diabetes, gestational hypertension |

| Author, Year           | Subgroup                          | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors |
|------------------------|-----------------------------------|-------|----------------------|---|---------------|--|-------------------------|--------------------------|------------------|
| Li, 2019 <sup>37</sup> | Eligible Participants (unmatched) | Arm 1 | Birth Year 2000-2008 | Breastfed at 6 months (Among respondents who indicated "Yes" to ever-breastfed, a follow-up question was asked: "How old was the child when the child completely stopped breastfeeding or being fed breast milk?" Based on this information, we further constructed a binary measure of breastfed at 6 months (Yes/No), which was only applicable to children of at least 6 months old. | NR            | Followup timepoint: NR<br>Outcome: NR (0.36) | -0.16 (SE 0.03), p<0.05 | Comparator: NR           | NR               |

| Author, Year           | Subgroup                             | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors |
|------------------------|--------------------------------------|-------|----------------------|---|---------------|--|-------------------------|--------------------------|------------------|
| Li, 2019 <sup>37</sup> | Eligible Nonparticipants (unmatched) | Arm 1 | Birth Year 2000-2008 | Breastfed at 6 months (Among respondents who indicated "Yes" to ever-breastfed, a follow-up question was asked: "How old was the child when the child completely stopped breastfeeding or being fed breast milk?" Based on this information, we further constructed a binary measure of breastfed at 6 months (Yes/No), which was only applicable to children of at least 6 months old. | NR            | Followup timepoint: NR<br>Outcome: NR (0.52) | NR                      | Comparator: NR           | NR               |



| Author, Year           | Subgroup                          | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors |
|------------------------|-----------------------------------|-------|----------------------|---|---------------|--|-------------------------|--------------------------|------------------|
| Li, 2019 <sup>37</sup> | Eligible Participants (unmatched) | Arm 2 | Birth Year 2009-2014 | Breastfed at 6 months (Among respondents who indicated "Yes" to ever-breastfed, a follow-up question was asked: "How old was the child when the child completely stopped breastfeeding or being fed breast milk?" Based on this information, we further constructed a binary measure of breastfed at 6 months (Yes/No), which was only applicable to children of at least 6 months old. | NR            | Followup timepoint: NR<br>Outcome: NR (0.32) | -0.17 (SE 0.05), p<0.05 | Comparator: NR           | NR               |

| Author, Year           | Subgroup                             | Arm   | Arm Name             | Outcome Definition  | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors |
|------------------------|--------------------------------------|-------|----------------------|---|---------------|--|-------------------------|--------------------------|------------------|
| Li, 2019 <sup>37</sup> | Eligible Nonparticipants (unmatched) | Arm 2 | Birth Year 2009-2014 | Breastfed at 6 months (Among respondents who indicated "Yes" to ever-breastfed, a follow-up question was asked: "How old was the child when the child completely stopped breastfeeding or being fed breast milk?" Based on this information, we further constructed a binary measure of breastfed at 6 months (Yes/No), which was only applicable to children of at least 6 months old. | NR            | Followup timepoint: NR<br>Outcome: NR (0.48) | NR                      | Comparator: NR           | NR               |

| Author, Year           | Subgroup                        | Arm   | Arm Name             | Outcome Definition                               | N at Analysis | Followup Outcome, n(%)                      | Within-group Difference | Between-group Difference | Adjusted Factors   |
|------------------------|---------------------------------|-------|----------------------|--|---------------|---|-------------------------|--------------------------|--|
| Li, 2019 <sup>37</sup> | Eligible Participants (matched) | Arm 1 | Birth Year 2000-2008 | Breastfed at 6 months - Matched treatment effect | NR            | Followup timepoint: NR<br>Outcome: NR (0.4) | -0.11 (SE 0.04), p<0.05 | Comparator: NR           | Variables used to estimate propensity scores included several key demographic characteristics of the child: age in months, gender (male and female), and race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, other Hispanics, and other race). Additional variables pertained to the child's family characteristics: marital status (married/living with partner, widowed/divorced/separated, and never married), educational attainment of the household reference person (less than high school, high school graduate, some college, and college graduate or higher), as well as household income to poverty ratio, which was defined as the household income divided by the applicable federal poverty line. We also included information about whether the household had ever received food stamps in the analyses |

| Author, Year           | Subgroup                           | Arm   | Arm Name             | Outcome Definition                               | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors   |
|------------------------|------------------------------------|-------|----------------------|--|---------------|--|-------------------------|--------------------------|--|
| Li, 2019 <sup>37</sup> | Eligible Nonparticipants (matched) | Arm 1 | Birth Year 2000-2008 | Breastfed at 6 months - Matched treatment effect | NR            | Followup timepoint: NR<br>Outcome: NR (0.51) | NR                      | Comparator: NR           | Variables used to estimate propensity scores included several key demographic characteristics of the child: age in months, gender (male and female), and race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, other Hispanics, and other race). Additional variables pertained to the child's family characteristics: marital status (married/living with partner, widowed/divorced/separated, and never married), educational attainment of the household reference person (less than high school, high school graduate, some college, and college graduate or higher), as well as household income to poverty ratio, which was defined as the household income divided by the applicable federal poverty line. We also included information about whether the household had ever received food stamps in the analyses |

| Author, Year           | Subgroup                        | Arm   | Arm Name             | Outcome Definition                               | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors   |
|------------------------|---------------------------------|-------|----------------------|--|---------------|--|-------------------------|--------------------------|--|
| Li, 2019 <sup>37</sup> | Eligible Participants (matched) | Arm 2 | Birth Year 2009-2014 | Breastfed at 6 months - Matched treatment effect | NR            | Followup timepoint: NR<br>Outcome: NR (0.32) | -0.13 (SE 0.08), p<0.05 | Comparator: NR           | Variables used to estimate propensity scores included several key demographic characteristics of the child: age in months, gender (male and female), and race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, other Hispanics, and other race). Additional variables pertained to the child's family characteristics: marital status (married/living with partner, widowed/divorced/separated, and never married), educational attainment of the household reference person (less than high school, high school graduate, some college, and college graduate or higher), as well as household income to poverty ratio, which was defined as the household income divided by the applicable federal poverty line. We also included information about whether the household had ever received food stamps in the analyses |

| Author, Year           | Subgroup                           | Arm   | Arm Name             | Outcome Definition                               | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors   |
|------------------------|------------------------------------|-------|----------------------|--|---------------|--|-------------------------|--------------------------|--|
| Li, 2019 <sup>37</sup> | Eligible Nonparticipants (matched) | Arm 2 | Birth Year 2009-2014 | Breastfed at 6 months - Matched treatment effect | NR            | Followup timepoint: NR<br>Outcome: NR (0.45) | NR                      | Comparator: NR           | Variables used to estimate propensity scores included several key demographic characteristics of the child: age in months, gender (male and female), and race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, other Hispanics, and other race). Additional variables pertained to the child's family characteristics: marital status (married/living with partner, widowed/divorced/separated, and never married), educational attainment of the household reference person (less than high school, high school graduate, some college, and college graduate or higher), as well as household income to poverty ratio, which was defined as the household income divided by the applicable federal poverty line. We also included information about whether the household had ever received food stamps in the analyses |

| Author, Year               | Subgroup | Arm   | Arm Name  | Outcome Definition   | N at Analysis | Followup Outcome, n(%)                      | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|----------|-------|---|--|---------------|---|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 2 months | Arm 1 | Any Breastfeeding/ Site has a Breastfeeding peer counselor (BFPC) program | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 2 months<br>Outcome: NR | OR: 1.26 (95% CI: 1.18 to 1.35), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 6 months | Arm 1 | Any Breastfeeding/ Site has a Breastfeeding peer counselor (BFPC) program | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 6 months<br>Outcome: NR | OR: 0.89 (95% CI: 0.83 to 0.95), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Subgroup  | Arm   | Arm Name   | Outcome Definition   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|--|--|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 1 | Any Breastfeeding/ Site has a Breastfeeding peer counselor (BFPC) program        | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 0.63 (95% CI: 0.59 to 0.68), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 2 months  | Arm 1 | Any Breastfeeding/ Site has a International Board Certified Lactation consultant | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 2 months<br>Outcome: NR  | OR: 0.9 (95% CI: 0.83 to 0.9), p=0.005   | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |



| Author, Year               | Subgroup  | Arm   | Arm Name   | Outcome Definition   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|--|--|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 6 months  | Arm 1 | Any Breastfeeding/ Site has a International Board Certified Lactation consultant | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 6 months<br>Outcome: NR  | OR: 1.09 (95% CI: 1.01 to 1.18), p=0.02  | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 1 | Any Breastfeeding/ Site has a International Board Certified Lactation consultant | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 1.45 (95% CI: 1.33 to 1.58), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Subgroup | Arm   | Arm Name  | Outcome Definition   | N at Analysis | Followup Outcome, n(%)                      | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|----------|-------|---|--|---------------|---|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 2 months | Arm 1 | Any Breastfeeding/Issuance of 1 can of formula for breastfed infants during first 30 days not permitted | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 2 months<br>Outcome: NR | OR: 1.23 (95% CI: .16 to 1.31), p<0.001  | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 6 months | Arm 1 | Any Breastfeeding/Issuance of 1 can of formula for breastfed infants during first 30 days not permitted | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 6 months<br>Outcome: NR | OR: 1.39 (95% CI: 1.31 to 1.48), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Subgroup  | Arm   | Arm Name  | Outcome Definition   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                 | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|---|--|---------------|--|---|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 1 | Any Breastfeeding/Issuance of 1 can of formula for breastfed infants during first 30 days not permitted | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 1.01 (95% CI: 0.95 to 1.08), p=0.72 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 2 months  | Arm 1 | Any Breastfeeding/BFPC or lactation consultant visit in home  | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 2 months<br>Outcome: NR  | OR: 1.05 (95% CI: 0.99 to 1.12), p=0.11 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Subgroup  | Arm   | Arm Name  | Outcome Definition   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|---|--|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 6 months  | Arm 1 | Any Breastfeeding/ BFPC or lactation consultant visit in home | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 6 months<br>Outcome: NR  | OR: 1.41 (95% CI: 1.32 to 1.51), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 1 | Any Breastfeeding/ BFPC or lactation consultant visit in home | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 1.54 (95% CI: 1.43 to 1.66), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Subgroup | Arm   | Arm Name   | Outcome Definition   | N at Analysis | Followup Outcome, n(%)                      | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|----------|-------|--|--|---------------|---|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 2 months | Arm 1 | Any Breastfeeding/<br>Any Staff member can provide breast pump education | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 2 months<br>Outcome: NR | OR: 1.05 (95% CI: 0.99 to 1.12), p=0.11  | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 6 months | Arm 1 | Any Breastfeeding/<br>Any Staff member can provide breast pump education | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 6 months<br>Outcome: NR | OR: 1.41 (95% CI: 1.32 to 1.51), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Subgroup  | Arm   | Arm Name   | Outcome Definition   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|--|--|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 1 | Any Breastfeeding/<br>Any Staff member can provide breast pump education | Number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 1.54 (95% CI: 1.43 to 1.66), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

APC= Annual Percentage Change; BFPC=Breastfeeding Peer Counseling; CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; PRAMS=Pregnancy Risk Assessment Monitoring System; Ref=reference; RR=risk ratio; SD=standard deviation; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-182. Breastfeeding duration categorical outcomes of studies investigating the association of the 2009 food package change with breastfeeding outcomes**

| Author, Year            | Subgroup | Arm   | Arm Name          | Outcome Definition               | Tool  | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------|----------|-------|-------------------|----------------------------------|---|---------------|--|-------------------------|--------------------------|------------------|
| Lee, 2017 <sup>69</sup> | NR       | Arm 1 | 2002 Birth Cohort | Infant breastfed $\geq 1$ month  | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 1$ month  | 122852        | Followup timepoint: NR<br>Outcome: NR (56.9) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 1 | 2002 Birth Cohort | Infant breastfed $\geq 3$ months | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 3$ months | 122852        | Followup timepoint: NR<br>Outcome: NR (40.6) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 1 | 2002 Birth Cohort | Infant breastfed $\geq 6$ months | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 6$ months | 122852        | Followup timepoint: NR<br>Outcome: NR (30.2) | NR                      | Comparator: NR           | NR               |

| Author, Year            | Subgroup | Arm   | Arm Name          | Outcome Definition                          | Tool   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------|----------|-------|-------------------|---|--|---------------|--|-------------------------|--------------------------|------------------|
| Lee, 2017 <sup>69</sup> | NR       | Arm 1 | 2002 Birth Cohort | Infant breastfed $\geq 12$ months           | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 12$ months | 122852        | Followup timepoint: NR<br>Outcome: NR (15)   | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 1 | 2002 Birth Cohort | Infant exclusively breastfed $\geq 1$ month | "How old was [the child] when they were first fed something other than breast milk?" Answer $\geq 1$ month | 122852        | Followup timepoint: NR<br>Outcome: NR        | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 2 | 2010 Birth Cohort | Infant breastfed $\geq 1$ month             | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 1$ month   | 125779        | Followup timepoint: NR<br>Outcome: NR (66.9) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 2 | 2010 Birth Cohort | Infant breastfed $\geq 3$ months            | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 3$ months  | 125779        | Followup timepoint: NR<br>Outcome: NR (50.6) | NR                      | Comparator: NR           | NR               |



| Author, Year            | Subgroup | Arm   | Arm Name          | Outcome Definition                          | Tool   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------|----------|-------|-------------------|---|--|---------------|--|-------------------------|--------------------------|------------------|
| Lee, 2017 <sup>69</sup> | NR       | Arm 2 | 2010 Birth Cohort | Infant breastfed $\geq 6$ months            | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 6$ months  | 125779        | Followup timepoint: NR<br>Outcome: NR (38.2) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 2 | 2010 Birth Cohort | Infant breastfed $\geq 12$ months           | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 12$ months | 125779        | Followup timepoint: NR<br>Outcome: NR (19.7) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 2 | 2010 Birth Cohort | Infant exclusively breastfed $\geq 1$ month | "How old was [the child] when they were first fed something other than breast milk?" Answer $\geq 1$ month | 125779        | Followup timepoint: NR<br>Outcome: NR (19)   | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 3 | 2015 Birth Cohort | Infant breastfed $\geq 1$ month             | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 1$ month   | 113806        | Followup timepoint: NR<br>Outcome: NR (71.7) | NR                      | Comparator: NR           | NR               |

| Author, Year            | Subgroup | Arm   | Arm Name          | Outcome Definition                          | Tool   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------|----------|-------|-------------------|---|--|---------------|--|-------------------------|--------------------------|------------------|
| Lee, 2017 <sup>69</sup> | NR       | Arm 3 | 2015 Birth Cohort | Infant breastfed $\geq 3$ months            | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 3$ months  | 113806        | Followup timepoint: NR<br>Outcome: NR (53.9) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 3 | 2015 Birth Cohort | Infant breastfed $\geq 6$ months            | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 6$ months  | 113806        | Followup timepoint: NR<br>Outcome: NR (39.5) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 3 | 2015 Birth Cohort | Infant breastfed $\geq 12$ months           | "How old was [the child] when they stopped being breastfed or fed breastmilk?" Answer was $\geq 12$ months | 113806        | Followup timepoint: NR<br>Outcome: NR (22.8) | NR                      | Comparator: NR           | NR               |
| Lee, 2017 <sup>69</sup> | NR       | Arm 3 | 2015 Birth Cohort | Infant exclusively breastfed $\geq 1$ month | "How old was [the child] when they were first fed something other than breast milk?" Answer $\geq 1$ month | 113806        | Followup timepoint: NR<br>Outcome: NR (23.2) | NR                      | Comparator: NR           | NR               |

| Author, Year            | Subgroup | Arm | Arm Name  | Outcome Definition  | Tool   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference     | Adjusted Factors |
|-------------------------|----------|-----|-----------|---|--|---------------|--|-------------------------|------------------------------|------------------|
| Lee, 2017 <sup>69</sup> | NR       | 0   | 2002-2015 | Annual Percentage Change (APC) in breastfeeding duration $\geq$ 1 month   | Fixed annual percentage change in breastfeeding duration $\geq$ 1 month from 2002-2015   | NR            | Followup timepoint: 2002-2015<br>Outcome: NR | NR                      | Comparator: NR: 1.7, p<0.05  | NR               |
| Lee, 2017 <sup>69</sup> | NR       | 0   | 2002-2015 | Annual Percentage Change (APC) in breastfeeding duration $\geq$ 3 months  | Fixed annual percentage change in breastfeeding duration $\geq$ 3 months from 2002-2015  | NR            | Followup timepoint: 2002-2015<br>Outcome: NR | NR                      | Comparator: NR: 1.9, p<0.05  | NR               |
| Lee, 2017 <sup>69</sup> | NR       | 0   | 2002-2004 | Annual Percentage Change (APC) in breastfeeding duration $\geq$ 6 months  | Fixed annual percentage change in breastfeeding duration $\geq$ 6 months from 2002-2004  | NR            | Followup timepoint: 2002-2004<br>Outcome: NR | NR                      | Comparator: NR: 13.2, p=0.06 | NR               |
| Lee, 2017 <sup>69</sup> | NR       | 0   | 2004-2005 | Annual Percentage Change (APC) in breastfeeding duration $\geq$ 6 months  | Fixed annual percentage change in breastfeeding duration $\geq$ 6 months from 2004-2005  | NR            | Followup timepoint: 2004-2005<br>Outcome: NR | NR                      | Comparator: NR: 0.3, p=ns    | NR               |
| Lee, 2017 <sup>69</sup> | NR       | 0   | 2002-2005 | Annual Percentage Change (APC) in breastfeeding duration $\geq$ 12 months | Fixed annual percentage change in breastfeeding duration $\geq$ 12 months from 2005-2015 | NR            | Followup timepoint: 2002-2005<br>Outcome: NR | NR                      | Comparator: NR: 17.2, p=ns   | NR               |

| Author, Year            | Subgroup | Arm   | Arm Name          | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)                          | Within-group Difference | Between-group Difference       | Adjusted Factors |
|-------------------------|----------|-------|-------------------|--|---|---------------|---|-------------------------|--------------------------------|------------------|
| Lee, 2017 <sup>69</sup> | NR       | 0     | 2005-2015         | Annual Percentage Change (APC) in breastfeeding duration $\geq 12$ months  | Fixed annual percentage change in breastfeeding duration $\geq 12$ months from 2002-2006  | NR            | Followup timepoint: 2005-2015<br>Outcome: NR    | NR                      | Comparator: NR: NR-level, p=ns | NR               |
| Lee, 2017 <sup>69</sup> | NR       | 0     | 2006-2015         | Annual Percentage Change (APC) in breastfeeding exclusivity $\geq 1$ month | Fixed annual percentage change in breastfeeding exclusivity $\geq 1$ month from 2006-2015 | NR            | Followup timepoint: 2006-2015<br>Outcome: NR    | NR                      | Comparator: NR: 5, p<0.05      | NR               |
| Lee, 2017 <sup>69</sup> | Hispanic | Arm 1 | 2002 Birth Cohort | Breastfeeding duration for $\geq 1$ month                                  | NR  | NR            | Followup timepoint: 2002<br>Outcome: NR (61.07) | NR                      | Comparator: NR                 | NR               |
| Lee, 2017 <sup>69</sup> | Hispanic | Arm 2 | 2010 Birth Cohort | Breastfeeding duration for $\geq 1$ month                                  | NR  | NR            | Followup timepoint: 2010<br>Outcome: NR (68.98) | NR                      | Comparator: NR                 | NR               |
| Lee, 2017 <sup>69</sup> | Hispanic | Arm 3 | 2015 Birth Cohort | Breastfeeding duration for $\geq 1$ month                                  | NR  | NR            | Followup timepoint: 2015<br>Outcome: NR (71.76) | NR                      | Comparator: NR                 | NR               |
| Lee, 2017 <sup>69</sup> | White    | Arm 1 | 2002 Birth Cohort | Breastfeeding duration for $\geq 1$ month                                  | NR  | NR            | Followup timepoint: 2002<br>Outcome: NR (60.49) | NR                      | Comparator: NR                 | NR               |
| Lee, 2017 <sup>69</sup> | White    | Arm 2 | 2010 Birth Cohort | Breastfeeding duration for $\geq 1$ month                                  | NR  | NR            | Followup timepoint: 2010<br>Outcome: NR (69.41) | NR                      | Comparator: NR                 | NR               |
| Lee, 2017 <sup>69</sup> | White    | Arm 3 | 2015 Birth Cohort | Breastfeeding duration for $\geq 1$ month                                  | NR  | NR            | Followup timepoint: 2015<br>Outcome: NR (74.24) | NR                      | Comparator: NR                 | NR               |

| Author, Year              | Subgroup                         | Arm   | Arm Name                | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                                   | Within-group Difference                        | Between-group Difference | Adjusted Factors   |
|---------------------------|----------------------------------|-------|-------------------------|--|------|---------------|--|--|--------------------------|--|
| Lee, 2017 <sup>69</sup>   | Black                            | Arm 1 | 2002 Birth Cohort       | Breastfeeding duration for $\geq 1$ month  | NR   | NR            | Followup timepoint: 2002<br>Outcome: NR (50.68)          | NR   | Comparator: NR           | NR   |
| Lee, 2017 <sup>69</sup>   | Black                            | Arm 2 | 2010 Birth Cohort       | Breastfeeding duration for $\geq 1$ month  | NR   | NR            | Followup timepoint: 2010<br>Outcome: NR (61.37)          | NR   | Comparator: NR           | NR   |
| Lee, 2017 <sup>69</sup>   | Black                            | Arm 3 | 2015 Birth Cohort       | Breastfeeding duration for $\geq 1$ month  | NR   | NR            | Followup timepoint: 2015<br>Outcome: NR (67.37)          | NR   | Comparator: NR           | NR   |
| Lee, 2017 <sup>69</sup>   | Asian                            | Arm 1 | 2002 Birth Cohort       | Breastfeeding duration for $\geq 1$ month  | NR   | NR            | Followup timepoint: 2002<br>Outcome: NR (44.83)          | NR   | Comparator: NR           | NR   |
| Lee, 2017 <sup>69</sup>   | Asian                            | Arm 2 | 2010 Birth Cohort       | Breastfeeding duration for $\geq 1$ month  | NR   | NR            | Followup timepoint: 2010<br>Outcome: NR (66.19)          | NR   | Comparator: NR           | NR   |
| Lee, 2017 <sup>69</sup>   | Asian                            | Arm 3 | 2015 Birth Cohort       | Breastfeeding duration for $\geq 1$ month  | NR   | NR            | Followup timepoint: 2015<br>Outcome: NR (73.22)          | NR   | Comparator: NR           | NR   |
| Joyce, 2015 <sup>67</sup> | WIC vs Eligible Non-participants | Arm 1 | PRAMS 2010 vs 2004-2007 | Difference in Proportion Breastfeeding $\geq 3$ months 2010 vs 2004-2007 WIC vs Eligible Non-participant | NR   | 127477        | Followup timepoint: 2-6 months postpartum<br>Outcome: NR | Mean change from baseline: 0.01 (SE 0.01), pns | Comparator: NR           | age, race/ethnicity, marital status, income, insurance (Medicaid or not), state and year, whether mother received WIC benefits |

| Author, Year                   | Subgroup                         | Arm   | Arm Name              | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                                 | Within-group Difference                           | Between-group Difference | Adjusted Factors   |
|--------------------------------|----------------------------------|-------|-----------------------|---|------|---------------|--|---|--------------------------|--|
| Joyce, 2015 <sup>67</sup>      | WIC vs Eligible Non-participants | Arm 2 | NIS 2010 vs 2004-2007 | Difference in Proportion Breastfeeding $\geq$ 4 weeks 2010 vs 2004-2007 WIC vs Eligible Non-participant | NR   | 73991         | Followup timepoint: 19-35 months of age<br>Outcome: NR | Mean change from baseline: -0.031 (SE 0.036), pns | Comparator: NR           | age, race/ethnicity, marital status, income, insurance (Medicaid or not), state and year, whether mother received WIC benefits |
| Joyce, 2015 <sup>67</sup>      | Pre vs Post food package month   | Arm 3 | PedNSS 2011 vs 2007   | Difference in proportion of infants ever breastfed at least one month                                   | NR   | 744           | Followup timepoint: NR<br>Outcome: NR                  | Mean change from baseline: 0.003 (SE 0.02), pns   | Comparator: NR           | month and state  |
| Langellier, 2014 <sup>68</sup> | NR                               | Arm 1 | 2005 survey year      | Any breastfeeding at 6 months   | NR   | 1772          | Followup timepoint: 2005<br>Outcome: NR (42.7)         | NR  | Comparator: NR<br>p=0.04 | NR   |
| Langellier, 2014 <sup>68</sup> | NR                               | Arm 1 | 2008 survey year      | Any breastfeeding at 6 months   | NR   | 1598          | Followup timepoint: 2008<br>Outcome: NR (47.9)         | NR  | Comparator: NR           | NR   |
| Langellier, 2014 <sup>68</sup> | NR                               | Arm 2 | 2011 survey year      | Any breastfeeding at 6 months   | NR   | 1650          | Followup timepoint: 2011<br>Outcome: NR (45.3)         | NR  | Comparator: NR           | NR   |

| Author, Year                   | Subgroup                             | Arm                              | Arm Name   | Outcome Definition                    | Tool  | N at Analysis  | Followup Outcome, n(%)                                   | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------------|--------------------------------------|----------------------------------|--|---------------------------------------|---|----------------|--|-------------------------|--|---|
| Langellier, 2014 <sup>68</sup> | New food package vs old food package | 2011 vs 2005 & 2008 survey years | 2011 vs 2005&2008 survey years                   | Odds of Any Breastfeeding at 6 months | NR  | NR             | Followup timepoint: NR<br>Outcome: NR                    | NR                      | Comparator: Arm 2 vs Arm 1<br>OR: 0.89 (95% CI: 0.75, 1.05), pns | child age, child gender, maternal age, education, race/ethnicity, nativity status, interview language. Household size, father living in household, number of years mother in WIC, intention to bf, formula discharge pack at hospital |
| Whaley, 2012 <sup>77</sup>     | NR                                   | Arm 1                            | Time 1: 12/2007-3/2009 (before new food package) | Fully breastfeeding at enrollment     | Rate of Issuance of fully breastfeeding package issued at enrollment    | 5000 per month | Followup timepoint: 12/2007-3/2009<br>Outcome: NR (23.8) | NR                      | Comparator: p<0.001  | %<100 FPL   |
| Whaley, 2012 <sup>77</sup>     | NR                                   | Arm 1                            | Time 1: 12/2007-3/2009 (before new food package) | Combined breastfeeding at enrollment  | Rate of Issuance of combined breastfeeding package issued at enrollment | 5000 per month | Followup timepoint: 12/2007-3/2009<br>Outcome: NR (46.1) | NR                      | Comparator: p<0.001  | NR  |

| Author, Year               | Subgroup | Arm   | Arm Name  | Outcome Definition                   | Tool  | N at Analysis  | Followup Outcome, n(%)                                   | Within-group Difference | Between-group Difference | Adjusted Factors |
|----------------------------|----------|-------|---|--------------------------------------|---|----------------|--|-------------------------|--------------------------|------------------|
| Whaley, 2012 <sup>77</sup> | NR       | Arm 1 | Time 1: 12/2007-3/2009 (before new food package)                    | Fully breastfeeding at 2 months      | Rate of Issuance of Fully breastfeeding package issued at 2 months of age | 5000 per month | Followup timepoint: 12/2007-3/2009<br>Outcome: NR (12.7) | NR                      | Comparator: p<0.001      | NR               |
| Whaley, 2012 <sup>77</sup> | NR       | Arm 1 | Time 1: 12/2007-3/2009 (before new food package)                    | Fully breastfeeding at 6 months      | Rate of Issuance of Fully breastfeeding package issued at 6 months of age | 5000 per month | Followup timepoint: 12/2007-3/2009<br>Outcome: NR (8.5)  | NR                      | Comparator: p<0.001      | NR               |
| Whaley, 2012 <sup>77</sup> | NR       | Arm 2 | Time 2: 4/2009-9/2009 (during training but before new food package) | Fully breastfeeding at enrollment    | Rate of Issuance of fully breastfeeding package issued at enrollment      | 5000 per month | Followup timepoint: 4/2009-9/2009<br>Outcome: NR (31.9)  | NR                      | Comparator: NR           | NR               |
| Whaley, 2012 <sup>77</sup> | NR       | Arm 2 | Time 2: 4/2009-9/2009 (during training but before new food package) | Combined breastfeeding at enrollment | Rate of Issuance of combined breastfeeding package issued at enrollment   | 5000 per month | Followup timepoint: 4/2009-9/2009<br>Outcome: NR (42.6)  | NR                      | Comparator: NR           | NR               |
| Whaley, 2012 <sup>77</sup> | NR       | Arm 2 | Time 2: 4/2009-9/2009 (during training but before new food package) | Fully breastfeeding at 2 months      | Rate of Issuance of Fully breastfeeding package issued at 2 months of age | 5000 per month | Followup timepoint: 4/2009-9/2009<br>Outcome: NR (15.8)  | NR                      | Comparator: NR           | NR               |



| Author, Year               | Subgroup | Arm   | Arm Name  | Outcome Definition                   | Tool  | N at Analysis  | Followup Outcome, n(%)                                    | Within-group Difference | Between-group Difference | Adjusted Factors |
|----------------------------|----------|-------|---|--------------------------------------|---|----------------|---|-------------------------|--------------------------|------------------|
| Whaley, 2012 <sup>77</sup> | NR       | Arm 2 | Time 2: 4/2009-9/2009 (during training but before new food package) | Fully breastfeeding at 6 months      | Rate of Issuance of Fully breastfeeding package issued at 6 months of age | 5000 per month | Followup timepoint: 4/2009-9/2009<br>Outcome: NR (9.3)    | NR                      | Comparator: NR           | NR               |
| Whaley, 2012 <sup>77</sup> | NR       | Arm 3 | 10/2009-11/2010 (after new food package)                            | Fully breastfeeding at enrollment    | Rate of Issuance of fully breastfeeding package issued at enrollment      | 5000 per month | Followup timepoint: 10/2009-11/2010<br>Outcome: NR (44.2) | NR                      | Comparator: NR           | NR               |
| Whaley, 2012 <sup>77</sup> | NR       | Arm 3 | 10/2009-11/2010 (after new food package)                            | Combined breastfeeding at enrollment | Rate of Issuance of combined breastfeeding package issued at enrollment   | 5000 per month | Followup timepoint: 10/2009-11/2010<br>Outcome: NR (28.6) | NR                      | Comparator: NR           | NR               |
| Whaley, 2012 <sup>77</sup> | NR       | Arm 3 | 10/2009-11/2010 (after new food package)                            | Fully breastfeeding at 2 months      | Rate of Issuance of Fully breastfeeding package issued at 2 months of age | 5000 per month | Followup timepoint: 10/2009-11/2010<br>Outcome: NR (19.9) | NR                      | Comparator: NR           | NR               |
| Whaley, 2012 <sup>77</sup> | NR       | Arm 3 | 10/2009-11/2010 (after new food package)                            | Fully breastfeeding at 6 months      | Rate of Issuance of Fully breastfeeding package issued at 6 months of age | 5000 per month | Followup timepoint: 10/2009-11/2010<br>Outcome: NR (13.9) | NR                      | Comparator: NR           | NR               |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition              | Tool  | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|---------------------------------|---|---------------|--|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 1 | Pre-implementation (3 months before new food package) | Breastfeeding exclusivity proxy | Receipt of Full Breastfeeding Package birth month | 18864         | Followup timepoint: Preimplementation Month 2 of study period (infant in birth month)<br>Outcome: NR (9.8) | NR                      | Comparator: p<0.001      | Household Income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition              | Tool  | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|---------------------------------|---|---------------|--|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 2 | Post-implementation (8 months after new food package) | Breastfeeding exclusivity proxy | Receipt of Full Breastfeeding Package birth month | 69387         | Followup timepoint: Postimplementation Month 10 of study period (infant birth month)<br>Outcome: NR (17.1) | NR                      | Comparator: NR           | Household Income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition              | Tool  | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|---------------------------------|---|---------------|--|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 1 | Pre-implementation (3 months before new food package) | Breastfeeding exclusivity proxy | Receipt of Full Breastfeeding Package at 3 months | 21672         | Followup timepoint: Preimplementation Month 2 of study period (infant at 3 months)<br>Outcome: NR (10.9) | NR                      | Comparator: p=ns         | Household Income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition              | Tool  | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|---------------------------------|---|---------------|--|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 2 | Post-implementation (8 months after new food package) | Breastfeeding exclusivity proxy | Receipt of Full Breastfeeding Package at 3 months | 93396         | Followup timepoint: Postimplementation Month 10 of study period (infant at 3 months)<br>Outcome: NR (11.1) | NR                      | Comparator: p=ns         | Household Income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition              | Tool  | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|---------------------------------|---|---------------|---|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 1 | Pre-implementation (3 months before new food package) | Breastfeeding exclusivity proxy | Receipt of Full Breastfeeding Package at 4 months | 22477         | Followup timepoint: Pre implementation Month 2 of study period (infant at 4 months)<br>Outcome: NR (10.4) | NR                      | Comparator: p=ns         | Household Income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition              | Tool  | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|---------------------------------|---|---------------|---|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 2 | Post-implementation (8 months after new food package) | Breastfeeding exclusivity proxy | Receipt of Full Breastfeeding Package at 4 months | 95359         | Followup timepoint: Postimplementation Month 10 of study period (infant at 4 months)<br>Outcome: NR (9.7) | NR                      | Comparator: p=ns         | Household Income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition              | Tool  | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|---------------------------------|---|---------------|---|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 1 | Pre-implementation (3 months before new food package) | Breastfeeding exclusivity proxy | Receipt of Full Breastfeeding Package at 5 months | 22996         | Followup timepoint: Preimplementation Month 2 of study period (infant at 5 months)<br>Outcome: NR (9.7) | NR                      | Comparator: p=ns         | Household Income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |



| Author, Year              | Subgroup | Arm   | Arm Name  | Outcome Definition              | Tool  | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference | Adjusted Factors   |
|---------------------------|----------|-------|---|---------------------------------|---|---------------|---|-------------------------|--------------------------|--|
| Wilde, 2012 <sup>78</sup> | NR       | Arm 2 | Post-implementation (8 months after new food package) | Breastfeeding exclusivity proxy | Receipt of Full Breastfeeding Package at 5 months | 96913         | Followup timepoint: Postimplementation Month 10 of study period (infant at 5 months)<br>Outcome: NR (9.5) | NR                      | Comparator: p=ns         | Household Income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |

| Author, Year                   | Subgroup | Arm      | Arm Name  | Outcome Definition                                 | Tool   | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|--------------------------------|----------|----------|---|--|--|---------------|---------------------------------------|-------------------------|--|--|
| Wilde, 2012 <sup>78</sup>      | NR       | Over all | Post-implementation vs Pre-implementation of food package | Breastfeeding exclusivity during birth month proxy | Odds of Receipt of Full Breastfeeding Package in the birth month | 77123         | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 1<br>OR: 2.567 (95% CI: 2.410, 2.734), p<0.001   | household income relative to the federal poverty standard, mother's race-ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, and other), program participation (SNAP and cash assistance), household size, mother's employment, and mother's highest level of education |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 1    | 2005 survey year  | Any breastfeeding at 3 months                      | NR   | 1772          | Followup timepoint: 2005<br>NR (57.3) | NR                      | Comparator: 2005 vs 2008 vs 2011 (Chi-square unadjusted) p=0.004 | NR   |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 1    | 2008 survey year  | Any breastfeeding at 3 months                      | NR   | 1598          | Followup timepoint: 2008<br>NR (62.3) | NR                      | Comparator: NR   | NR   |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 2    | 2011 survey year  | Any breastfeeding at 3 months                      | NR   | 1650          | Followup timepoint: 2011<br>NR (62.5) | NR                      | Comparator: NR   | NR   |

| Author, Year                   | Subgroup                             | Arm   | Arm Name                       | Outcome Definition                           | Tool   | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------------|--------------------------------------|-------|--------------------------------|--|--|---------------|--|-------------------------|--|---|
| Langellier, 2014 <sup>68</sup> | New food package vs old food package | 0     | 2011 vs 2005&2008 survey years | Odds of Any Breastfeeding at 3 months        | NR   | NR            | Followup timepoint: NR<br>NR                 | NR                      | Comparator: Arm 2 vs Arm 1<br>OR: 0.95 (95% CI: 0.81, 1.11), pns | child age, child gender, maternal age, education, race/ethnicity, nativity status, interview language. Household size, father living in household, number of years mother in WIC, intention to bf, formula discharge pack at hospital |
| Lee, 2017 <sup>69</sup>        | NR                                   | Arm 1 | 2002 Birth Cohort              | Infant exclusively breastfed $\geq 3$ months | "How old was [the child] when they were first fed something other than breast milk?"<br>Answer $\geq 3$ months | 122852        | Followup timepoint: NR<br>Outcome: NR        | NR                      | Comparator: NR   | NR  |
| Lee, 2017 <sup>69</sup>        | NR                                   | Arm 2 | 2010 Birth Cohort              | Infant exclusively breastfed $\geq 3$ months | "How old was [the child] when they were first fed something other than breast milk?"<br>Answer $\geq 3$ months | 125779        | Followup timepoint: NR<br>Outcome: NR (10.5) | NR                      | Comparator: NR   | NR  |

| Author, Year                   | Subgroup | Arm   | Arm Name          | Outcome Definition  | Tool  | N at Analysis | Followup Outcome, n(%)                         | Within-group Difference | Between-group Difference        | Adjusted Factors |
|--------------------------------|----------|-------|-------------------|---|---|---------------|--|-------------------------|---------------------------------|------------------|
| Lee, 2017 <sup>69</sup>        | NR       | Arm 3 | 2015 Birth Cohort | Infant exclusively breastfed $\geq 3$ months                                | "How old was [the child] when they were first fed something other than breast milk?" Answer $\geq 3$ months | 113806        | Followup timepoint: NR<br>Outcome: NR (14.3)   | NR                      | Comparator: NR                  | NR               |
| Lee, 2017 <sup>69</sup>        | NR       | 0     | 2006-2015         | Annual Percentage Change (APC) in breastfeeding exclusivity $\geq 3$ months | Fixed annual percentage change in breastfeeding exclusively $\geq 3$ months from 2006-2015                  | NR            | Followup timepoint: 2006-2015<br>Outcome: NR   | NR                      | Comparator: NR: 5.8, $p < 0.05$ | NR               |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 1 | 2005 survey year  | Exclusive Breastfeeding at 3 months see Notes                               | NR  | 1772          | Followup timepoint: 2005<br>Outcome: NR (10.9) | NR                      | Comparator: NR $p < 0.001$      | NR               |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 1 | 2008 survey year  | Exclusive Breastfeeding at 3 months see Notes                               | NR  | 1598          | Followup timepoint: 2008<br>Outcome: NR (13.7) | NR                      | Comparator: NR                  | NR               |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 2 | 2011 survey year  | Exclusive Breastfeeding at 3 months see Notes                               | NR  | 1650          | Followup timepoint: 2011<br>Outcome: NR (22.1) | NR                      | Comparator: NR                  | NR               |

| Author, Year                   | Subgroup                             | Arm      | Arm Name                       | Outcome Definition                          | Tool   | N at Analysis | Followup Outcome, n(%)                      | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------------|--------------------------------------|----------|--------------------------------|---|--|---------------|---|-------------------------|--|---|
| Langellier, 2014 <sup>68</sup> | New food package vs old food package | Over all | 2011 vs 2005&2008 survey years | Odds of Exclusive Breastfeeding at 3 months | NR   | NR            | Followup timepoint: NR<br>Outcome: NR       | NR                      | Comparator: Arm 2 vs Arm 1<br>OR: 1.72 (95% CI: 1.43, 2.07), p<0.001 | child age, child gender, maternal age, education, race/ethnicity, nativity status, interview language. Household size, father living in household, number of years mother in WIC, intention to bf, formula discharge pack at hospital |
| Lee, 2017 <sup>69</sup>        | NR                                   | Arm 1    | 2002 Birth Cohort              | Infant exclusively breastfed ≥6 months      | "How old was [the child] when they were first fed something other than breast milk?"<br>Answer ≥6 months | 122852        | Followup timepoint: NR<br>Outcome: NR       | NR                      | Comparator: NR   | NR  |
| Lee, 2017 <sup>69</sup>        | NR                                   | Arm 2    | 2010 Birth Cohort              | Infant exclusively breastfed ≥6 months      | "How old was [the child] when they were first fed something other than breast milk?"<br>Answer ≥6 months | 125779        | Followup timepoint: NR<br>Outcome: NR (5.8) | NR                      | Comparator: NR   | NR  |

| Author, Year                   | Subgroup | Arm   | Arm Name          | Outcome Definition  | Tool  | N at Analysis | Followup Outcome, n(%)                         | Within-group Difference | Between-group Difference         | Adjusted Factors |
|--------------------------------|----------|-------|-------------------|---|---|---------------|--|-------------------------|----------------------------------|------------------|
| Lee, 2017 <sup>69</sup>        | NR       | Arm 3 | 2015 Birth Cohort | Infant exclusively breastfed $\geq 6$ months                                | "How old was [the child] when they were first fed something other than breast milk?" Answer $\geq 6$ months | 113806        | Followup timepoint: NR<br>Outcome: NR (8)      | NR                      | Comparator: NR                   | NR               |
| Lee, 2017 <sup>69</sup>        | NR       | 0     | 2006-2010         | Annual Percentage Change (APC) in breastfeeding exclusivity $\geq 6$ months | Fixed annual percentage change in breastfeeding exclusively $\geq 3$ months from 2006-2015                  | NR            | Followup timepoint: 2006-2010<br>Outcome: NR   | NR                      | Comparator: NR: 18.9, $p < 0.05$ | NR               |
| Lee, 2017 <sup>69</sup>        | NR       | 0     | 2010-2015         | Annual Percentage Change (APC) in breastfeeding exclusivity $\geq 6$ months | Fixed annual percentage change in breastfeeding exclusively $\geq 6$ months from 2010-2015                  | NR            | Followup timepoint: 2010-2015<br>Outcome: NR   | NR                      | Comparator: NR: 6.2, $p < 0.05$  | NR               |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 1 | 2005 survey year  | Exclusive Breastfeeding at 6 months see Notes                               | NR  | 1772          | Followup timepoint: 2005<br>Outcome: NR (3)    | NR                      | Comparator: NR $p < 0.001$       | NR               |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 1 | 2008 survey year  | Exclusive Breastfeeding at 6 months see Notes                               | NR  | 1598          | Followup timepoint: 2008<br>Outcome: NR (5.4)  | NR                      | Comparator: NR                   | NR               |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 2 | 2011 survey year  | Exclusive Breastfeeding at 6 months see Notes                               | NR  | 1650          | Followup timepoint: 2011<br>Outcome: NR (11.7) | NR                      | Comparator: NR                   | NR               |

| Author, Year                   | Subgroup                             | Arm | Arm Name                       | Outcome Definition                          | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------------|--------------------------------------|-----|--------------------------------|---|------|---------------|---------------------------------------|-------------------------|--|---|
| Langellier, 2014 <sup>68</sup> | New food package vs old food package | 0   | 2011 vs 2005&2008 survey years | Odds of Exclusive Breastfeeding at 6 months | NR   | NR            | Followup timepoint: NR<br>Outcome: NR | NR                      | Comparator: Arm 2 vs Arm 1<br>OR: 3.08 (95% CI: 2.27, 4.18), p<0.001 | child age, child gender, maternal age, education, race/ethnicity, nativity status, interview language. Household size, father living in household, number of years mother in WIC, intention to bf, formula discharge pack at hospital |

APC= Annual Percentage Change; BFPC=Breastfeeding Peer Counseling; CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; PRAMS=Pregnancy Risk Assessment Monitoring System; Ref=reference; RR=risk ratio; SD=standard deviation; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-183. Breastfeeding duration continuous outcomes of studies investigating the association between breastfeeding outcomes and WIC participation compared with eligible non-participants**

| Author, Year                        | Sub-group | Arm   | Arm Name   | Outcome Definition     | Tool | N                              | Followup Outcome   | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-------------------------------------|-----------|-------|--|------------------------|------|--------------------------------|--|-------------------------|---|------------------|
| McCoy, 2018 (Study A) <sup>11</sup> | No        | Arm 1 | Not assigned a peer prenatally (reference group) | Breastfeeding duration | NA   | Baseline: 345<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Median: 51 (SD NR)<br>Followup: NR  | NR                      | Comparator: NR<br>Not reported                                  | NR               |
| McCoy, 2018 (Study A) <sup>11</sup> | No        | Arm 2 | Assigned a peer, but no prenatal services        | Breastfeeding duration | NA   | Baseline: 733<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Median: 69 (SD NR)<br>Followup: NR  | NR                      | Comparator: NR<br>Not reported                                  | NR               |
| McCoy, 2018 (Study A) <sup>11</sup> | No        | Arm 3 | Assigned a peer and received prenatal services   | Breastfeeding duration | NA   | Baseline: 1141<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Median: 86 (SD NR)<br>Followup: NR  | NR                      | Comparator: NR<br>Not reported                                  | NR               |
| McCoy, 2018 (Study B) <sup>11</sup> | No        | Arm 1 | Did not receive peer services at any time point  | Breastfeeding duration | NA   | Baseline: 558<br>Followup: NA  | Followup timepoint: NA<br>Outcome: Baseline: Median: 85 (SD NR)<br>Followup: NR  | NR                      | Comparator: 2 vs. 1 (month 1)<br>Not reported: ,<br>p≤0.001     | NR               |
| McCoy, 2018 (Study B) <sup>11</sup> | No        | Arm 2 | Received peer services                           | Breastfeeding duration | NA   | Baseline: 1342<br>Followup: NA | Followup timepoint: NA<br>Outcome: Baseline: Median: 128 (SD NR)<br>Followup: NR | NR                      | Comparator: 2 vs. 1 (months 2-12)<br>Not reported: ,<br>p≤0.001 | NR               |



| Author, Year           | Sub-group | Arm   | Arm Name                              | Outcome Definition              | Tool | N                            | Followup Outcome   | Within-group Difference | Between-group Difference                             | Adjusted Factors  |
|------------------------|-----------|-------|---------------------------------------|---------------------------------|------|------------------------------|--|-------------------------|--|---|
| Ma, 2014 <sup>10</sup> | No        | Arm 1 | Income-eligible, non-WIC Participants | Breastfeeding duration in weeks | NA   | Baseline: NR<br>Followup: NR | Followup timepoint: NA<br>Outcome: Baseline: Mean: 10.08 (SD 0.79)<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>Not reported: , $p \leq 0.05$ | Maternal race, age, trying to get pregnant, maternal education, marital status, infant gender, maternal smoking during last 3 months of pregnancy, maternal drinking during last 3 months of pregnancy, previous live birth, breastfeeding education/information received during pregnancy, low birthweight, preterm birth, initiation of prenatal care, gestational diabetes, gestational hypertension |

| Author, Year           | Sub-group | Arm   | Arm Name         | Outcome Definition              | Tool | N                            | Followup Outcome  | Within-group Difference | Between-group Difference | Adjusted Factors  |
|------------------------|-----------|-------|------------------|---------------------------------|------|------------------------------|---|-------------------------|--------------------------|---|
| Ma, 2014 <sup>10</sup> | No        | Arm 2 | WIC Participants | Breastfeeding duration in weeks | NA   | Baseline: NR<br>Followup: NR | Followup timepoint: NA<br>Outcome: Baseline: Mean: 7.69 (SD 0.48)<br>Followup: NR | NR                      | Comparator: NR           | Maternal race, age, trying to get pregnant, maternal education, marital status, infant gender, maternal smoking during last 3 months of pregnancy, maternal drinking during last 3 months of pregnancy, previous live birth, breastfeeding education/information received during pregnancy, low birthweight, preterm birth, initiation of prenatal care, gestational diabetes, gestational hypertension |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-184. Breastfeeding exclusive categorical outcomes of studies investigating the association between breastfeeding outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|--|--|------|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 2 months  | Arm 2 | Fully Breastfeeding/Site has a Breastfeeding peer counselor (BFPC) program | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 2 months<br>Outcome: NR  | OR: 0.94 (95% CI: 0.86 to 1.02), p=0.12  | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 6 months  | Arm 2 | Fully Breastfeeding/Site has a Breastfeeding peer counselor (BFPC) program | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 6 months<br>Outcome: NR  | OR: 0.77 (95% CI: 0.71 to 0.83), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 2 | Fully Breastfeeding/Site has a Breastfeeding peer counselor (BFPC) program | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 0.76 (95% CI: 0.69 to 0.84), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Sub-group | Arm   | Arm Name  | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|---|--|------|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 2 months  | Arm 2 | Fully Breastfeeding/Site has a International Board Certified Lactation consultant | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 2 months<br>Outcome: NR  | OR: 1.37 (95% CI: 1.25 to 1.50), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 6 months  | Arm 2 | Fully Breastfeeding/Site has a International Board Certified Lactation consultant | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 6 months<br>Outcome: NR  | OR: 1.68 (95% CI: 1.54 to 1.83), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 2 | Fully Breastfeeding/Site has a International Board Certified Lactation consultant | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 2.18 (95% CI: 1.97 to 2.42), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Sub-group | Arm   | Arm Name  | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|---|--|------|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 2 months  | Arm 2 | Fully Breastfeeding/Issuance of 1 can of formula for breastfed infants during first 30 days not permitted | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 2 months<br>Outcome: NR  | OR: 1.12 (95% CI: 1.04 to 1.21), p=0.002 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 6 months  | Arm 2 | Fully Breastfeeding/Issuance of 1 can of formula for breastfed infants during first 30 days not permitted | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 6 months<br>Outcome: NR  | OR: 1.03 (95% CI: 0.96 to 1.11), p=0.42  | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 2 | Fully Breastfeeding/Issuance of 1 can of formula for breastfed infants during first 30 days not permitted | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 1.07 (95% CI: 0.98 to 1.18), p=0.12  | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Sub-group | Arm   | Arm Name  | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|---|--|------|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 2 months  | Arm 2 | Fully Breastfeeding/BF PC or lactation consultant visit in home | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 2 months<br>Outcome: NR  | OR: 1.52 (95% CI: 1.41 to 1.65), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 6 months  | Arm 2 | Fully Breastfeeding/BF PC or lactation consultant visit in home | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 6 months<br>Outcome: NR  | OR: 2.13 (95% CI: 1.98 to 2.30), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 2 | Fully Breastfeeding/BF PC or lactation consultant visit in home | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 2 (95% CI: 1.83 to 2.20), p<0.001    | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                       | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|--|--|------|---------------|--|--|--------------------------|---|
| Gleason, 2020 <sup>7</sup> | 2 months  | Arm 2 | Fully Breastfeeding/Any Staff member can provide breast pump education | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 2 months<br>Outcome: NR  | OR: 1.35 (95% CI: 1.26 to 1.45), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 6 months  | Arm 2 | Fully Breastfeeding/Any Staff member can provide breast pump education | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 6 months<br>Outcome: NR  | OR: 1.37 (95% CI: 1.27 to 1.47), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |
| Gleason, 2020 <sup>7</sup> | 12 months | Arm 2 | Fully Breastfeeding/Any Staff member can provide breast pump education | Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula. | NA   | NR            | Followup timepoint: 12 months<br>Outcome: NR | OR: 1.24 (95% CI: 1.13 to 1.36), p<0.001 | Comparator: NR           | Mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale |

BFPC=Breastfeeding Peer Counseling; CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; Ref=reference; RR=risk ratio; SD=standard deviation; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-185. Breastfeeding feeding practice categorical outcomes of studies investigating the association of the 2009 food package change with breastfeeding outcomes**

| Author, Year                   | Subgroup | Arm   | Arm Name         | Outcome Definition                  | Tool | N at Analysis | Followup Outcome, n(%)                         | Within-group Difference | Between-group Difference  | Adjusted Factors |
|--------------------------------|----------|-------|------------------|-------------------------------------|------|---------------|--|-------------------------|---------------------------|------------------|
| Langellier, 2014 <sup>68</sup> | NR       | Arm 1 | 2005 survey year | In hospital breastfeeding exclusive | NR   | 1772          | Followup timepoint: 2005<br>Outcome: NR (21.1) | NR                      | Comparator: NR<br>p<0.001 | NR               |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 1 | 2008 survey year | In hospital breastfeeding exclusive | NR   | 1598          | Followup timepoint: 2008<br>Outcome: NR (24.1) | NR                      | Comparator: NR<br>p<0.001 | NR               |
| Langellier, 2014 <sup>68</sup> | NR       | Arm 2 | 2011 survey year | In hospital breastfeeding exclusive | NR   | 1650          | Followup timepoint: 2011<br>Outcome: NR (39.1) | NR                      | Comparator: NR<br>p<0.001 | NR               |

n=sample size; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-186. Introduction to complementary foods categorical outcomes of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Sub-group | Arm   | Arm Name              | Outcome Definition   | Tool | N at Analysis | Follow up Outcome, n(%)          | Outcome Unit | Within-group Difference | Between-group Difference                             | Adjusted Factors   |
|-----------------------------|-----------|-------|-----------------------|--|------|---------------|----------------------------------|--------------|-------------------------|--|--|
| Barrera, 2018 <sup>24</sup> | NR        | Arm 1 | Not income eligible   | Introduction of complementary foods before 4 months of age | NR   | 546           | Followup timepoint: NA 546 (100) | NR           | NR                      | Comparator: Ref p=NA                                 | breastfeeding status, sex, race/hispanic origin, maternal age, maternal smoking during pregnancy |
| Barrera, 2018 <sup>24</sup> | NR        | Arm 2 | Eligible-received     | Introduction of complementary foods before 4 months of age | NR   | 828           | Followup timepoint: NA 828 (100) | NR           | NR                      | Comparator: Arm 1 OR: 0.97 (95% CI: 0.67-1.41), p=NA | breastfeeding status, sex, race/hispanic origin, maternal age, maternal smoking during pregnancy |
| Barrera, 2018 <sup>24</sup> | NR        | Arm 3 | Eligible-not received | Introduction of complementary foods before 4 months of age | NR   | 108           | Followup timepoint: NA 108 (100) | NR           | NR                      | Comparator: Arm 1 OR: 1.6 (95% CI: 0.76-3.37), p=NA  | breastfeeding status, sex, race/hispanic origin, maternal age, maternal smoking during pregnancy |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-187. Diet quality categorical outcomes (total HEI scores) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition               | Tool     | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|----------------------------------|----------|---|--|--------------|-------------------------|--|---|
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC Participants | HEI-2010 WIC Food Package Change | HEI-2010 | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 50, Median: 49.1 (SD NR)<br>Followup: Mean 52.4, Median: 50.2 (SD NR)   | NR           | NR                      | Comparator: Ref  | Race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status                              |
| Tester, 2016 <sup>45</sup> | NR        | Arm 2 | WIC Participants     | HEI-2010 WIC Food Package Change | HEI-2010 | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 52.4, Median: 52.5 (SD NR)<br>Followup: Mean 58.3, Median: 58.2 (SD NR) | NR           | NR                      | Comparator: Arm1<br>Difference in change: 3.7 (95% CI: 0.6 to 6.9), p=0.02 | Race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status                              |
| Gu, 2017 <sup>29</sup>     | NR        | Arm 1 | No WIC               | Healthy Eating Index 2010        | HEI-2010 | Baseline: NR<br>Followup: 169   | Followup timepoint: 1999–2000<br>Baseline: NR<br>Followup: Mean 44.5 (95% CI: 41.6 to 47.4)  | NR           | NR                      | Comparator: Ref  | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition        | Tool     | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------|-----------|-------|----------|---------------------------|----------|-------------------------------|---|--------------|-------------------------|----------------------------|---|
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 279 | Followup timepoint: 1999-2000<br>Baseline: NR<br>Followup: Mean 46.1 (95% CI: 42.0 to 50.1) | NR           | NR                      | Comparator: Arm1<br>p=0.66 | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 234 | Followup timepoint: 2001-2002<br>Baseline: NR<br>Followup: Mean 45.6 (95% CI: 41.7 to 49.6) | NR           | NR                      | Comparator: Ref            | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 321 | Followup timepoint: 2001-2002<br>Baseline: NR<br>Followup: Mean 44.9 (95% CI: 42.3 to 47.6) | NR           | NR                      | Comparator: Arm1<br>p=0.61 | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition        | Tool     | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------|-----------|-------|----------|---------------------------|----------|-------------------------------|---|--------------|-------------------------|----------------------------|---|
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 387 | Followup timepoint: 2003-2004<br>Baseline: NR<br>Followup: Mean 47.7 (95% CI: 44.4 to 51.0) | NR           | NR                      | Comparator: Ref            | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 606 | Followup timepoint: 2003-2004<br>Baseline: NR<br>Followup: Mean 48.5 (95% CI: 46.4 to 50.7) | NR           | NR                      | Comparator: Arm1<br>p=0.69 | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 368 | Followup timepoint: 2005-2006<br>Baseline: NR<br>Followup: Mean 53.4 (95% CI: 50.0 to 56.7) | NR           | NR                      | Comparator: Ref            | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition        | Tool     | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------|-----------|-------|----------|---------------------------|----------|-------------------------------|---|--------------|-------------------------|----------------------------|---|
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 680 | Followup timepoint: 2005-2006<br>Baseline: NR<br>Followup: Mean 53.7 (95% CI: 52.0 to 55.5) | NR           | NR                      | Comparator: Arm1<br>p=0.09 | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 325 | Followup timepoint: 2007-2008<br>Baseline: NR<br>Followup: Mean 53.4 (95% CI: 51.3 to 55.6) | NR           | NR                      | Comparator: Ref            | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 633 | Followup timepoint: 2007-2008<br>Baseline: NR<br>Followup: Mean 51.2 (95% CI: 49.1 to 53.3) | NR           | NR                      | Comparator: Arm1<br>p=0.47 | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition        | Tool     | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------|-----------|-------|----------|---------------------------|----------|-------------------------------|---|--------------|-------------------------|----------------------------|---|
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 305 | Followup timepoint: 2009-2010<br>Baseline: NR<br>Followup: Mean 51.2 (95% CI: 47.9 to 54.5) | NR           | NR                      | Comparator: Ref            | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 775 | Followup timepoint: 2009-2010<br>Baseline: NR<br>Followup: Mean 53.7 (95% CI: 51.2 to 56.1) | NR           | NR                      | Comparator: Arm1<br>p=0.49 | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 312 | Followup timepoint: 2011-2012<br>Baseline: NR<br>Followup: Mean 21.3 (95% CI: 48.9 to 53.7) | NR           | NR                      | Comparator: Ref            | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition        | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference            | Between-group Difference    | Adjusted Factors  |
|------------------------|-----------|-------|----------|---------------------------|----------|--------------------------------|---|--------------|------------------------------------|-----------------------------|---|
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 757  | Followup timepoint: 2011-2012<br>Baseline: NR<br>Followup: Mean 55.8 (95% CI: 53.9 to 57.8) | NR           | NR                                 | Comparator: Arm1<br>p=0.008 | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 2100 | Followup timepoint: 1999-2012<br>Baseline: NR<br>Followup: NR                               | NR           | Mean change from baseline, p=0.001 | Comparator: NR              | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 4051 | Followup timepoint: 1999-2012<br>Baseline: NR<br>Followup: NR                               | NR           | Mean change from baseline, p<0.001 | Comparator: NR              | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |

| Author, Year           | Sub-group | Arm   | Arm Name | Outcome Definition        | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference            | Between-group Difference | Adjusted Factors  |
|------------------------|-----------|-------|----------|---------------------------|----------|--------------------------------|---|--------------|------------------------------------|--------------------------|---|
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 2100 | Followup timepoint: 1999-2012<br>Baseline: NR<br>Followup: NR | NR           | Mean change from baseline, p<0.001 | Comparator: NR           | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 2 | WIC      | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 4051 | Followup timepoint: 1999-2012<br>Baseline: NR<br>Followup: NR | NR           | Mean change from baseline, p=0.58  | Comparator: NR           | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Gu, 2017 <sup>29</sup> | NR        | Arm 1 | No WIC   | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 2100 | Followup timepoint: 1999-2012<br>Baseline: NR<br>Followup: NR | NR           | NR                                 | Comparator: Ref          | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |



| Author, Year                  | Sub-group | Arm   | Arm Name     | Outcome Definition        | Tool     | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference                                       | Adjusted Factors  |
|-------------------------------|-----------|-------|--------------|---------------------------|----------|--------------------------------|---|--------------|-------------------------|--|---|
| Gu, 2017 <sup>29</sup>        | NR        | Arm 2 | WIC          | Healthy Eating Index 2010 | HEI-2010 | Baseline: NR<br>Followup: 4051 | Followup timepoint: 1999-2012<br>Baseline: NR<br>Followup: NR                                       | NR           | NR                      | Comparator: Arm1<br>p=0.006                                    | Sex, age, total energy intake, race/ethnicity, PIR, household size, and reference person's education level and marriage status. For analyses of the WIC and school meal, the model was further adjusted for the participation in the SNAP |
| Weinfield, 2020 <sup>49</sup> | NR        | Arm 1 | Low          | Total HEI-2015 Score      | NR       | Baseline: NA<br>Followup: 63   | Followup timepoint: approx 24 months<br>Baseline: NR<br>Followup: NR<br>56.4 (95% CI: 53.8 to 58.9) | NR           | NR                      | Comparator: Ref  | 0   |
| Weinfield, 2020 <sup>49</sup> | NR        | Arm 2 | Intermediate | Total HEI-2015 Score      | NR       | Baseline: NA<br>Followup: 237  | Followup timepoint: approx 24 months<br>Baseline: NR<br>Followup: NR<br>59.2 (95% CI: 57.7 to 60.8) | NR           | NR                      | Comparator: Arm 1<br>NR: 3.39 (95% CI: -1.06,7.84),<br>p=0.132 | Mothers race and ethnicity, poverty level at 13 months, mother's education at baseline  |
| Weinfield, 2020 <sup>49</sup> | NR        | Arm 3 | High         | Total HEI-2015 Score      | NR       | Baseline: NA<br>Followup: 1041 | Followup timepoint: approx 24 months<br>Baseline: NR<br>Followup: NR<br>60.8 (95% CI: 60.1 to 60.6) | NR           | NR                      | Comparator: Arm 1<br>NR: 4.06 (95% CI: 0.30-7.82),<br>p=0.035  | Mothers race and ethnicity, poverty level at 13 months, mother's education at baseline  |

| Author, Year                  | Sub-group | Arm   | Arm Name         | Outcome Definition   | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors   |
|-------------------------------|-----------|-------|------------------|----------------------|----------|--------------------------------|--|--------------|-------------------------|-----------------------------|--|
| Weinfield, 2020 <sup>49</sup> | NR        | Arm 1 | Low              | Total HEI-2015 Score | NR       | Baseline: NA<br>Followup: 63   | Followup timepoint: approx 24 months<br>Baseline: NR<br>Followup: Mean 55.2 (95% CI: 51.6 to 58.8) | NR           | NR                      | Comparator: all<br>p=0.0002 | 0  |
| Weinfield, 2020 <sup>49</sup> | NR        | Arm 2 | Intermediate     | Total HEI-2015 Score | NR       | Baseline: NA<br>Followup: 237  | Followup timepoint: approx 24 months<br>Baseline: NR<br>Followup: Mean 59.2 (95% CI: 57.6 to 60.8) | NR           | NR                      | Comparator: all<br>p=0.0002 | 0  |
| Weinfield, 2020 <sup>49</sup> | NR        | Arm 3 | High             | Total HEI-2015 Score | NR       | Baseline: NA<br>Followup: 1041 | Followup timepoint: approx 24 months<br>Baseline: NR<br>Followup: Mean 60.9 (95% CI: 60.2 to 61.7) | NR           | NR                      | Comparator: all<br>p=0.0002 | 0  |
| Weinfield, 2020 <sup>48</sup> | NR        | Arm 1 | WIC Duration Low | Total HEI-2015 Score | HEI-2015 | Baseline: 59<br>Followup: NR   | Followup timepoint: ≤4 interviews<br>Baseline: NR<br>Followup: NR                                  | NR           | NR                      | Comparator: Ref             | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |

| Author, Year                  | Sub-group | Arm   | Arm Name                  | Outcome Definition   | Tool     | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|---------------------------|----------------------|----------|-------------------------------|--|--------------|-------------------------|---|--|
| Weinfield, 2020 <sup>48</sup> | NR        | Arm 2 | WIC Duration Intermediate | Total HEI-2015 Score | HEI-2015 | Baseline: 207<br>Followup: NR | Followup timepoint: 5-7 interviews<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>Beta coefficient: 0.36 (95% CI: 0.04 to 0.69), p=0.03  | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |
| Weinfield, 2020 <sup>48</sup> | NR        | Arm 3 | WIC Duration High         | Total HEI-2015 Score | HEI-2015 | Baseline: 957<br>Followup: NR | Followup timepoint: 5-7 interviews<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>Beta coefficient: 0.41 (95% CI: 0.12 to 0.71), p=0.007 | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |

BMI=body mass index; CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NDSR=Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-188. Diet quality categorical outcomes (total HEI scores) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year             | Sub-group | Arm   | Arm Name         | Outcome Definition   | Tool                      | N                             | Followup Outcome   | Outcome Unit     | Within-group Difference               | Between-group Difference | Adjusted Factors  |
|--------------------------|-----------|-------|------------------|----------------------|---------------------------|-------------------------------|--|------------------|---------------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Children  | Arm 1 | Hispanic         | HEI-2005 total score | 24-hour recall, NDSR, HEI | Baseline: 112<br>Followup: 89 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 55.6 (SE 1.9)<br>Followup: Mean 59.6 (SE 1.9) | score out of 100 | % change from baseline: 0.072, p=0.02 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Children  | Arm 2 | African American | HEI-2005 total score | 24-hour recall, NDSR, HEI | Baseline: 97<br>Followup: 64  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 51.8 (SE 1.8)<br>Followup: Mean 53.6 (SE 1.8) | score out of 100 | % change from baseline: 0.035, p=0.32 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |

BMI=body mass index; CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NDSR=Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-189. Dietary intake categorical outcomes (calcium) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group      | Arm   | Arm Name                             | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)             | Outcome Unit | Within-group Difference | Between-group Difference                                 | Adjusted Factors |
|-------------------------|----------------|-------|--------------------------------------|---|------|---------------|------------------------------------|--------------|-------------------------|--|------------------|
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 1 | WIC participant                      | % of children with intake above adequate intake               | NR   | 375           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref  | NR               |
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 2 | Non WIC Participants , lower income  | % of children with intake above adequate intake               | NR   | 169           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 97.9 (SE 2.6), p=NR   | NR               |
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 3 | Non WIC Participants , higher income | % of children with intake above adequate intake               | NR   | 357           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 93.9 (SE 1.5), p<0.05 | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 1 | WIC participant                      | % of children with intake below estimated average requirement | NR   | 380           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref  | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 2 | Non WIC Participants , lower income  | % of children with intake below estimated average requirement | NR   | 233           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 5.9 (SE 1.8), p<0.05  | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 3 | Non WIC Participants , higher income | % of children with intake below estimated average requirement | NR   | 519           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 7.5 (SE 2.1), p=NR    | NR               |

| Author, Year            | Sub-group      | Arm   | Arm Name                             | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)             | Outcome Unit | Within-group Difference | Between-group Difference                              | Adjusted Factors |
|-------------------------|----------------|-------|--------------------------------------|---|------|---------------|------------------------------------|--------------|-------------------------|---|------------------|
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 1 | WIC participant                      | % of children with intake below estimated average requirement | NR   | 161           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref                                       | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 2 | Non WIC Participants , lower income  | % of children with intake below estimated average requirement | NR   | 135           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 9.5 (SE 3.6), p=NR | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 3 | Non WIC Participants , higher income | % of children with intake below estimated average requirement | NR   | 300           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 8.3 (SE 2), p=NR   | NR               |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-190. Dietary intake categorical outcomes (dietary fiber) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group      | Arm   | Arm Name                             | Outcome Definition                                    | Tool   | N at Analysis | Followup Outcome, n(%)             | Within-group Difference | Between-group Difference                              | Adjusted Factors |
|-------------------------|----------------|-------|--------------------------------------|---|--|---------------|------------------------------------|-------------------------|---|------------------|
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 1 | WIC participant                      | % of children with fiber intake above adequate intake | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 161           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Ref                                       | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 2 | Non WIC Participants , lower income  | % of children with fiber intake above adequate intake | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 135           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Arm 1<br>Not reported: 6.6 (SE 1.4), p=NR | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 3 | Non WIC Participants , higher income | % of children with fiber intake above adequate intake | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 300           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Arm 1<br>Not reported: 8.5 (SE 2.7), p=NR | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 1 | WIC participant                      | % of children with fiber intake above adequate intake | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 380           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Ref                                       | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 2 | Non WIC Participants , lower income  | % of children with fiber intake above adequate intake | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 233           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Arm 1<br>Not reported: 2.4 (SE 2.8), p=NR | NR               |

| Author, Year            | Sub-group      | Arm   | Arm Name                             | Outcome Definition                                    | Tool   | N at Analysis | Followup Outcome, n(%)             | Within-group Difference | Between-group Difference                                 | Adjusted Factors |
|-------------------------|----------------|-------|--------------------------------------|---|--|---------------|------------------------------------|-------------------------|--|------------------|
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 3 | Non WIC Participants , higher income | % of children with fiber intake above adequate intake | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 519           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Arm 1<br>Not reported: 4.9 (SE 1.3),<br>p=NR | NR               |

n=sample size; NA=not available; NCI=National Cancer Institute; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-191. Dietary intake categorical outcomes (iron) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Subgroup       | Arm   | Arm Name                             | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)             | Outcome Unit | Within-group Difference | Between-group Difference                                  | Adjusted Factors |
|-------------------------|----------------|-------|--------------------------------------|---|------|---------------|------------------------------------|--------------|-------------------------|---|------------------|
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 1 | WIC participant                      | % of children with intake below estimated average requirement | NR   | 375           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref   | NR               |
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 2 | Non WIC Participants , lower income  | % of children with intake below estimated average requirement | NR   | 169           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 25.6 (SE 6.6), p<0.001 | NR               |
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 3 | Non WIC Participants , higher income | % of children with intake below estimated average requirement | NR   | 357           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 34 (SE 2.3), p<0.001   | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 1 | WIC participant                      | % of children with intake below estimated average requirement | NR   | 380           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref   | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 2 | Non WIC Participants , lower income  | % of children with intake below estimated average requirement | NR   | 233           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 0 (SE 6.6), p=NR       | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 3 | Non WIC Participants , higher income | % of children with intake below estimated average requirement | NR   | 519           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 6 (SE 1.3), p≤0.05     | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 1 | WIC participant                      | % of children with intake below estimated average requirement | NR   | 161           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref   | NR               |

| Author, Year            | Subgroup       | Arm   | Arm Name                             | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)          | Outcome Unit | Within-group Difference | Between-group Difference                              | Adjusted Factors |
|-------------------------|----------------|-------|--------------------------------------|---|------|---------------|---------------------------------|--------------|-------------------------|---|------------------|
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 2 | Non WIC Participants , lower income  | % of children with intake below estimated average requirement | NR   | 135           | Followup timepoint: baseline NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 3.7 (SE 4), p=NR   | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 3 | Non WIC Participants , higher income | % of children with intake below estimated average requirement | NR   | 300           | Followup timepoint: baseline NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 2.6 (SE 1.1), p=NR | NR               |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-192. Dietary intake categorical outcomes (zinc) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Subgroup       | Arm   | Arm Name                            | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)             | Outcome Unit | Within-group Difference | Between-group Difference                                 | Adjusted Factors |
|-------------------------|----------------|-------|-------------------------------------|--|------|---------------|------------------------------------|--------------|-------------------------|--|------------------|
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 1 | WIC participant                     | % of children with zinc intake less than estimated average requirement | NR   | 375           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref  | NR               |
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 2 | Non WIC Participants, lower income  | % of children with zinc intake less than estimated average requirement | NR   | 169           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 4.8 (SE 1.5), p=NR    | NR               |
| Jun, 2018 <sup>34</sup> | 6-11.9 months  | Arm 3 | Non WIC Participants, higher income | % of children with zinc intake less than estimated average requirement | NR   | 357           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 8.9 (SE 1.3), p≤0.001 | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 1 | WIC participant                     | % of children with zinc intake less than estimated average requirement | NR   | 161           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref  | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 2 | Non WIC Participants, lower income  | % of children with zinc intake less than estimated average requirement | NR   | 135           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 0.2 (SE 2.9), p=NR    | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 3 | Non WIC Participants, higher income | % of children with zinc intake less than estimated average requirement | NR   | 300           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 0.5 (SE 0.8), p=NR    | NR               |

| Author, Year            | Subgroup       | Arm   | Arm Name                            | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)          | Outcome Unit | Within-group Difference | Between-group Difference                              | Adjusted Factors |
|-------------------------|----------------|-------|-------------------------------------|--|------|---------------|---------------------------------|--------------|-------------------------|---|------------------|
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 1 | WIC participant                     | % of children with zinc intake less than estimated average requirement | NR   | 380           | Followup timepoint: baseline NR | NR           | NR                      | Comparator: Ref                                       | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 2 | Non WIC Participants, lower income  | % of children with zinc intake less than estimated average requirement | NR   | 233           | Followup timepoint: baseline NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 1.1 (SE 6.8), p=NR | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 3 | Non WIC Participants, higher income | % of children with zinc intake less than estimated average requirement | NR   | 519           | Followup timepoint: baseline NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 0.9 (SE 1.1), p=NR | NR               |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-193. Dietary intake continuous outcomes (calcium) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group            | Arm   | Arm Name     | Outcome Definition                            | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|---|------|------------------------------|--|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (260 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 4<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.69 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (260 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 3<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.69 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (260 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 5<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.69 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (260 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 2<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.69 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (260 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 4<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (260 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 3<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001                                       | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|--|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 3 | 2016 non-WIC | % having less than adequate intake (260 mg/d)               | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 5<br>Followup: NR   | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | % having less than adequate intake (260 mg/d)               | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 2<br>Followup: NR   | NR           | NR                      | Comparator: Arm 3<br>% : p≥0.0001                                      | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 6.7<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.5 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 9<br>Followup: NR   | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.5 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 7.2<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.5 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 11<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.5 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 6.7<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                 | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|--|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 9<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1<br>% : $p \geq 0.0001$                                    | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 7.2<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : $p = \text{NR}$                           | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 11<br>Followup: NR  | NR           | NR                      | Comparator: Arm 3<br>% : $p \geq 0.0001$                                    | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 7.5<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.03$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 10<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.03$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 8.3<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.03$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 6.7<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.03$ | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|--|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 7.5<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 10<br>Followup: NR  | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001      | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 8.3<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (500 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 6.7<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001      | % FPL            |

FPL=federal poverty level; Mg/d=milligram per day; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-194. Dietary intake continuous outcomes (dietary fiber) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Sub-group         | Arm     | Arm Name         | Outcome Definition | Tool                 | N                              | Followup Outcome   | Outcome Unit | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|---------------------------------|-------------------|---------|------------------|--------------------|----------------------|--------------------------------|--|--------------|--|--------------------------|---|
| Kong, 2014 <sup>19</sup>        | Children          | Arm 1   | Hispanic         | fiber              | 24-hour recall, NDSR | Baseline: 112<br>Followup: 89  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 7.4 (SE 0.5)<br>Followup: Mean 10.6 (SE 0.6)                                      | g/1000 kcal  | % change from baseline: -0.153, p=0.0004 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup>        | Children          | Arm 2   | African American | fiber              | 24-hour recall, NDSR | Baseline: 97<br>Followup: 64   | Followup timepoint: 18 months after baseline<br>Baseline: Mean 6.3 (SE 1.2)<br>Followup: Mean 10.6 (SE 1.1)                                      | g/1000 kcal  | % change from baseline: -0.036, p=0.55   | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children | Overall | Overall          | Fiber, g/1000 kcal | 24 hour recall (NDS) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 8.4 (SD 4.2)<br>Followup: Mean 9.4 (SD 5) | g/1000kcal   | Mean change from baseline                | Comparator: NR           | 0   |

| Author, Year                    | Sub-group                 | Arm     | Arm Name     | Outcome Definition                          | Tool                 | N                            | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference  | Adjusted Factors |
|---------------------------------|---------------------------|---------|--------------|---|----------------------|------------------------------|--|--------------|---------------------------|---|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall      | Fiber, g/1000 kcal                          | 24 hour recall (NDS) | Baseline: 90<br>Followup: 90 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 6 (SD 2.6)<br>Followup: Mean 6.1 (SD 2.3) | g/1000kcal   | Mean change from baseline | Comparator: NR  | 0                |
| Guthrie, 2020 <sup>65</sup>     | Age 12 to 23.9 months     | Arm 1   | 2008 non-WIC | % having less than adequate intake (19 g/d) | NR                   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 99<br>Followup: NR  | NR           | NR                        | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.07 | % FPL            |
| Guthrie, 2020 <sup>65</sup>     | Age 12 to 23.9 months     | Arm 2   | 2008 WIC     | % having less than adequate intake (19 g/d) | NR                   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 99<br>Followup: NR  | NR           | NR                        | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.07 | % FPL            |
| Guthrie, 2020 <sup>65</sup>     | Age 12 to 23.9 months     | Arm 3   | 2016 non-WIC | % having less than adequate intake (19 g/d) | NR                   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 96<br>Followup: NR  | NR           | NR                        | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.07 | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                          | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 98<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.07 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 99<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 99<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 96<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 98<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001                                       | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                          | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 99<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.25 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 99<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.25 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 91<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.25 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 91<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.25 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 99<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                          | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 99<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001      | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 91<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (19 g/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 91<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001      | % FPL            |

BMI=body mass index; FPL=federal poverty level; g/1000kcal=grams per 1000 kilocalories; g/d=grams per day; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-195. Dietary intake continuous outcomes (food energy) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name             | Outcome Definition | Tool | N  | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|----------|-------|----------------------|--------------------|------|--|---|--------------|-------------------------|--------------------------|---|
| Tester, 2016 <sup>45</sup> | NR       | Arm 1 | Non-WIC Participants | Empty calories     | NR   | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup : NR | Followup timepoint : After WIC Food Package Change (2011–2012),<br>Baseline: Mean 11 (NR)<br>Followup: Mean 12.4 (NR) | NR           | NR                      | Comparator: Ref          | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year               | Subgroup | Arm   | Arm Name         | Outcome Definition | Tool | N  | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|----------|-------|------------------|--------------------|------|--|---|--------------|-------------------------|--|---|
| Tester, 2016 <sup>45</sup> | NR       | Arm 2 | WIC Participants | Empty calories     | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup : NR | Followup timepoint : After WIC Food Package Change (2011–2012),<br>Baseline: Mean 12.4 (NR)<br>Followup: Mean 14 (NR) | NR           | NR                      | Comparator: Arm1<br>Ratio of Relative Changes: 1 (95% CI: 0.9 to 1.2),<br>p=0.69 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

BMI=body mass index; CI=confidence interval; FPL=federal poverty level; kcal/d=kilocalories per day; IQR=interquartile range; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-196. Dietary intake continuous outcomes (food energy) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                  | Subgroup                    | Arm   | Arm Name | Outcome Definition           | Tool                               | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------------------------|-------|----------|------------------------------|------------------------------------|------------------------------|---|--------------|-------------------------|---|--|
| Thornton , 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 1 | 2009     | total kilocalorie intake/day | 24-hr recall, NDSR, first day only | Baseline: 33<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 836.3<br>Followup: NR | kcal/d       | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 836.3 (IQR: 487.8), p=REF   | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Thornton , 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 2 | 2011     | kilocalories total           | 24-hr recall, NDSR, first day only | Baseline: 54<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 960.3<br>Followup: NR | kcal/d       | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 960.3 (IQR: 791.2), p=0.394 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment  |



| Author, Year                  | Subgroup                | Arm   | Arm Name | Outcome Definition | Tool                               | N                             | Followup Outcome   | Outcome Unit | Within-group Difference                | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-------------------------|-------|----------|--------------------|------------------------------------|-------------------------------|--|--------------|--|---|---|
| Thornton , 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 1 | 2009     | kilocalories total | 24-hr recall, NDSR, first day only | Baseline: 34<br>Followup: NR  | Followup timepoint: NR<br>Baseline: Median: 715.8<br>Followup: NR  | kcal/d       | NR                                     | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 715.8 (IQR: 355.3), p=REF   | status, race, body mass index, insurance status, and language spoken at home  |
| Thornton , 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 2 | 2011     | kilocalories total | 24-hr recall, NDSR, first day only | Baseline: 40<br>Followup: NR  | Followup timepoint: NR<br>Baseline: Median: 705.5<br>Followup: NR  | kcal/d       | NR                                     | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 705.5 (IQR: 595.8), p=0.101 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment |
| Kong, 2014 <sup>19</sup>      | Children                | Arm 1 | Hispanic | energy             | 24-hour recall, NDSR               | Baseline: 112<br>Followup: 89 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 1038.7 (SE 62.6)<br>Followup: Mean 1193.9 (SE 61.9) | kcal         | % change from baseline: 0.149, p=0.003 | Comparator: NR  | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status               |

| Author, Year                    | Subgroup          | Arm     | Arm Name         | Outcome Definition | Tool                  | N                              | Followup Outcome   | Outcome Unit | Within-group Difference                | Between-group Difference | Adjusted Factors  |
|---------------------------------|-------------------|---------|------------------|--------------------|-----------------------|--------------------------------|--|--------------|--|--------------------------|---|
| Kong, 2014 <sup>19</sup>        | Children          | Arm 2   | African American | energy             | 24-hour recall, NDSR  | Baseline: 97<br>Followup: 64   | Followup timepoint: 18 months after baseline<br>Baseline: Mean 1130.6 (SE 57.1)<br>Followup: Mean 1366.7 (SE 62.3)                                     | kcal         | % change from baseline: 0.209, p=0.003 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children | Overall | Overall          | Energy             | 24 hour recall (NDSR) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 4438 (SD 1772)<br>Followup: Mean 4812 (SD 1798) | kJ           | Mean change from baseline              | Comparator: NR           | 0   |

| Author, Year                    | Subgroup                  | Arm     | Arm Name | Outcome Definition | Tool                  | N                            | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|--------------------|-----------------------|------------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | Energy             | 24 hour recall (NDSR) | Baseline: 90<br>Followup: 90 | Followup timepoint: yes - follow-up assessment t 6 months post WIC food package change<br>Baseline: Mean 4712 (SD 2043)<br>Followup: Mean 5440 (SD 2143) | kJ           | Mean change from baseline | Comparator: NR           | 0                |

BMI=body mass index; CI=confidence interval; FPL=federal poverty level; kcal/d=kilocalories per day; IQR=interquartile range; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-197. Dietary intake continuous outcomes (iron) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Subgroup                    | Arm   | Arm Name     | Outcome Definition  | Tool                               | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-----------------------------|-------|--------------|---|------------------------------------|------------------------------|--|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 1 | 2009         | iron intake /day  | 24-hr recall, NDSR, first day only | Baseline: 33<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 8<br>Followup: NR  | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 8 (IQR: 13.4), p=REF    | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Thornton, 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 2 | 2011         | iron intake /day  | 24-hr recall, NDSR, first day only | Baseline: 54<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 12<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 12 (IQR: 11.6), p=0.523 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Guthrie, 2020 <sup>65</sup>  | Age 6 to 11.9 months        | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (6.9 mg/d) | NR                                 | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 12<br>Followup: NR      | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.009                                    | % FPL  |

| Author, Year                | Subgroup             | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|---|------|------------------------------|--|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (6.9 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 2.2<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.009 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (6.9 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 31<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.009 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (6.9 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 13<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.009 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (6.9 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 12<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (6.9 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 2.2<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p≥0.0001  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (6.9 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 31<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                   | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|--|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | % having less than estimated average requirement (6.9 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 13<br>Followup: NR  | NR           | NR                      | Comparator: Arm 3<br>% : p=≤0.0001  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (3 mg/d)   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 4.1<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0002 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (3 mg/d)   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 1<br>Followup: NR   | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0002 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (3 mg/d)   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 5.6<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0002 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (3 mg/d)   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 7.7<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0002 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (3 mg/d)   | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 4.1<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                    | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|--|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 1<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1<br>% : $p \geq 0.0001$                                     | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 5.6<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : $p = \text{NR}$                            | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 7.7<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : $p \geq 0.0001$                                     | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 3.8<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.008$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 1<br>Followup: NR   | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.008$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 3.2<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.008$ | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|--|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 3.6<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.008 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 3.8<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 1<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 3.2<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (3 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 3.6<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001  | % FPL            |

FPL=federal poverty level; IQR=interquartile range; Mg/d=milligram per day; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC=Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-198. Dietary intake continuous outcomes (linoleic acid) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group | Arm   | Arm Name     | Outcome Definition                           | Tool                       | N                             | Followup Outcome                            | Outcome Unit | Within-group Difference | Between-group Difference        | Adjusted Factors  |
|-------------------------|-----------|-------|--------------|--|----------------------------|-------------------------------|---|--------------|-------------------------|---------------------------------|---|
| Kay, 2021 <sup>35</sup> | NR        | Arm 1 | WIC          | Linoleic acid component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 3.6 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator: Arm 2 & 3 : p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 2 | WIC-Eligible | Linoleic acid component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR | Baseline: Mean 3.8 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator: Arm 1 & 3 : p>0.05  | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |

| Author, Year            | Sub-group | Arm   | Arm Name | Outcome Definition                                  | Tool                       | N                             | Followup Outcome                            | Outcome Unit | Within-group Difference | Between-group Difference        | Adjusted Factors  |
|-------------------------|-----------|-------|----------|---|----------------------------|-------------------------------|---|--------------|-------------------------|---------------------------------|---|
| Kay, 2021 <sup>35</sup> | NR        | Arm 3 | Non-WIC  | Linoleic acid component of Toddler DQI score        | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR | Baseline: Mean 3.6 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator: Arm 1 & 2 : p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 1 | WIC      | Alpha-linolenic acid component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 4.4 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator: Arm 2 & 3 : p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |

| Author, Year            | Sub-group | Arm   | Arm Name     | Outcome Definition                                  | Tool                       | N                             | Followup Outcome                            | Outcome Unit | Within-group Difference | Between-group Difference        | Adjusted Factors  |
|-------------------------|-----------|-------|--------------|---|----------------------------|-------------------------------|---|--------------|-------------------------|---------------------------------|---|
| Kay, 2021 <sup>35</sup> | NR        | Arm 2 | WIC-Eligible | Alpha-linolenic acid component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR | Baseline: Mean 4.4 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator: Arm 1 & 3 : p>0.05  | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 3 | Non-WIC      | Alpha-linolenic acid component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR | Baseline: Mean 4.4 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator: Arm 1 & 2 : p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |

CI=confidence interval; DQI=Diet Quality Index; N=sample size; NR=not reported; p=p-value; SE=standard error; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-199. Dietary intake continuous outcomes (potassium) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Sub-group               | Arm   | Arm Name | Outcome Definition    | Tool                               | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-------------------------|-------|----------|-----------------------|------------------------------------|------------------------------|---|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 1 | 2009     | potassium intake /day | 24-hr recall, NDSR, first day only | Baseline: 34<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 996.1<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 996.1 (IQR: 792.8), p=REF | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

| Author, Year                 | Sub-group               | Arm   | Arm Name     | Outcome Definition                            | Tool                               | N                            | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|-------------------------|-------|--------------|---|------------------------------------|------------------------------|--|--------------|-------------------------|--|--|
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 2 | 2011         | potassium intake /day                         | 24-hr recall, NDSR, first day only | Baseline: 40<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 1128.2<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 1128.2 (IQR: 891.1), p=0.017 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Guthrie, 2020 <sup>65</sup>  | Age 6 to 11.9 months    | Arm 1 | 2008 non-WIC | % having less than adequate intake (860 mg/d) | NR                                 | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 29<br>Followup: NR          | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.41  | % FPL  |
| Guthrie, 2020 <sup>65</sup>  | Age 6 to 11.9 months    | Arm 2 | 2008 WIC     | % having less than adequate intake (860 mg/d) | NR                                 | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 21<br>Followup: NR          | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.41  | % FPL  |

| Author, Year                | Sub-group            | Arm   | Arm Name     | Outcome Definition                            | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|---|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (860 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 32<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.41 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (860 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 21<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.41 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (860 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 29<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (860 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 21<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p≥0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (860 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 32<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                             | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | % having less than adequate intake (860 mg/d)  | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 21<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : $p \geq 0.0001$                                   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 82<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.001$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 75<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.001$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 71<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.001$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 73<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.001$ | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                             | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 82<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 75<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p≥0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 71<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 73<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 73<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.07 | % FPL            |



| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                             | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 67<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.07 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 55<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.07 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 64<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.07 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 73<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 67<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001                                       | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                             | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 55<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (2000 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 64<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001      | % FPL            |

FPL=federal poverty level; IQR=interquartile range; Mg/d=milligram per day; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-200. Dietary intake continuous outcomes (vitamins) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Subgroup                    | Arm   | Arm Name | Outcome Definition         | Tool                                | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-----------------------------|-------|----------|----------------------------|-------------------------------------|------------------------------|---|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 1 | 2009     | vitamin A (RAE) intake/day | 24-hr recall, NDS R, first day only | Baseline: 33<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 649.9<br>Followup: NR | RAE/d        | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 649.9 (IQR: 594.4), p=REF   | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment  |
| Thornton, 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 2 | 2011     | vitamin A (RAE) intake/day | 24-hr recall, NDS R, first day only | Baseline: 54<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 759.1<br>Followup: NR | RAE/d        | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 759.1 (IQR: 719.8), p=0.546 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

| Author, Year                 | Subgroup                | Arm   | Arm Name | Outcome Definition         | Tool                                | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-------------------------|-------|----------|----------------------------|-------------------------------------|------------------------------|---|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 1 | 2009     | vitamin A (RAE) intake/day | 24-hr recall, NDS R, first day only | Baseline: 34<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 680.1<br>Followup: NR | RAE/d        | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 680.1 (IQR: 655.6), p=REF   | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 2 | 2011     | vitamin A (RAE) intake/day | 24-hr recall, NDS R, first day only | Baseline: 40<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 529<br>Followup: NR   | RAE/d        | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 529 (IQR: 447.2), p=0.050** | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

| Author, Year                 | Subgroup                    | Arm   | Arm Name | Outcome Definition   | Tool                                | N                            | Followup Outcome  | Outcome Unit  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-----------------------------|-------|----------|----------------------|-------------------------------------|------------------------------|---|---------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 1 | 2009     | vitamin D intake/day | 24-hr recall, NDS R, first day only | Baseline: 33<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 6.4<br>Followup: NR | microgram s/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 6.4 (IQR: 5.5), p=REF   | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Thornton, 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 2 | 2011     | vitamin D intake/day | 24-hr recall, NDS R, first day only | Baseline: 54<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 8.1<br>Followup: NR | microgram s/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 8.1 (IQR: 3.4), p=0.401 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment  |

| Author, Year                 | Subgroup                | Arm   | Arm Name | Outcome Definition   | Tool                                | N                            | Followup Outcome  | Outcome Unit  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-------------------------|-------|----------|----------------------|-------------------------------------|------------------------------|---|---------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 1 | 2009     | vitamin D intake/day | 24-hr recall, NDS R, first day only | Baseline: 34<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 6.1<br>Followup: NR | microgram s/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 6.1 (IQR: 5.9), p=REF   | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 2 | 2011     | vitamin D intake/day | 24-hr recall, NDS R, first day only | Baseline: 40<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 7<br>Followup: NR   | microgram s/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 7 (IQR: 5.7), p=0.054** | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

| Author, Year                | Subgroup             | Arm   | Arm Name     | Outcome Definition                           | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 91<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0002 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | % having less than adequate intake (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 86<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0002 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | % having less than adequate intake (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 92<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0002 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | % having less than adequate intake (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 76<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0002 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 91<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                    | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 2 | 2008 WIC     | % having less than adequate intake (10 mg/d)               | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 86<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p≥0.0001  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 3 | 2016 non-WIC | % having less than adequate intake (10 mg/d)               | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 92<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | % having less than adequate intake (10 mg/d)               | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 76<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p=≤0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than adequate intake (10 mg/d)               | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 77<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.003 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 81<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.003 | % FPL            |



| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 80<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.003 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 76<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.003 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 77<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 81<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p≥0.0001  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 80<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                   | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 76<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p≥0.0001   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 83<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0003 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 86<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0003 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 86<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0003 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 79<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.0003 | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 83<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 86<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001      | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 86<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (10 mg/d) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 79<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001      | % FPL            |

| Author, Year                 | Subgroup                    | Arm   | Arm Name | Outcome Definition                              | Tool                                | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-----------------------------|-------|----------|---|-------------------------------------|------------------------------|---|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 2 | 2011     | vitamin E intake (not specified as to type)/day | 24-hr recall, NDS R, first day only | Baseline: 54<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 5.3<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 5.3 (IQR: 4.2), p=0.567 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months     | Arm 1 | 2009     | vitamin E intake (not specified as to type)/day | 24-hr recall, NDS R, first day only | Baseline: 34<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 4.6<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 4.6 (IQR: 5.3), p=REF   | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

| Author, Year                 | Subgroup                | Arm   | Arm Name | Outcome Definition                              | Tool                                | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-------------------------|-------|----------|---|-------------------------------------|------------------------------|---|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 2 | 2011     | vitamin E intake (not specified as to type)/day | 24-hr recall, NDS R, first day only | Baseline: 40<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 5.2<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 5.2 (IQR: 5.5), p=0.386 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

FPL=federal poverty level; IQR=interquartile range; Mg/d=milligram per day; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; RAE= Retinol Activity Equivalents; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-201. Dietary intake continuous outcomes (zinc) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Sub-group                   | Arm   | Arm Name | Outcome Definition | Tool                                 | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-----------------------------|-------|----------|--------------------|--------------------------------------|-------------------------------|---|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | older infants 6-11.9 months | Arm 2 | 2011     | zinc intake /day   | 24-hr recall , NDS R, first day only | Baseline: 54<br>Followup : NR | Followup timepoint: NR<br>Baseline: Median: 7.1<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 7.1 (IQR: 6.5), p=0.697 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

| Author, Year                 | Sub-group               | Arm   | Arm Name | Outcome Definition | Tool                                 | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-------------------------|-------|----------|--------------------|--------------------------------------|-------------------------------|---|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 1 | 2009     | zinc intake /day   | 24-hr recall , NDS R, first day only | Baseline: 34<br>Followup : NR | Followup timepoint: NR<br>Baseline: Median: 4.9<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 4.9 (IQR: 3.5), p=REF | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

| Author, Year                 | Sub-group               | Arm   | Arm Name     | Outcome Definition  | Tool                                 | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|-------------------------|-------|--------------|---|--------------------------------------|-------------------------------|---|--------------|-------------------------|---|--|
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 2 | 2011         | zinc intake /day  | 24-hr recall , NDS R, first day only | Baseline: 40<br>Followup : NR | Followup timepoint: NR<br>Baseline: Median: 4.8<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 4.8 (IQR: 3.7), p=0.002 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Guthrie, 2020 <sup>65</sup>  | Age 6 to 11.9 months    | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR                                   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 3.4<br>Followup: NR      | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.27                                     | % FPL  |
| Guthrie, 2020 <sup>65</sup>  | Age 6 to 11.9 months    | Arm 2 | 2008 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR                                   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.4<br>Followup: NR      | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.27                                     | % FPL  |



| Author, Year                | Sub-group            | Arm   | Arm Name     | Outcome Definition  | Tool | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|---|------|-------------------------------|--|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 6.6<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.27 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 1.8<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.27 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 3.4<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.4<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p≥0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 6.6<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|-------------------------------|--|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 1.8<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p≥0.0001                                      | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.8<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.1 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.3<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.1 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 1<br>Followup: NR   | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.1 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 1.5<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.1 | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|-------------------------------|--|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.8<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.3<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p≥0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 1<br>Followup: NR   | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 1.5<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p≥0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.8<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.28 | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|-------------------------------|--|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.3<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.28 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.3<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.28 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.4<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.28 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.8<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.3<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001                                       | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|-------------------------------|--|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.3<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less than estimated average requirement (2.5 mg/d) | NR   | Baseline: NR<br>Followup : NR | Followup timepoint: NR<br>Baseline: %: 0.4<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001      | % FPL            |

FPL=federal poverty level; IQR=interquartile range; Mg/d=milligram per day; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-202. Dietary intake categorical outcomes (fat) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Subgroup       | Arm   | Arm Name                            | Outcome Definition                               | Tool   | N at Analysis | Followup Outcome, n(%)             | Outcome Unit | Within-group Difference | Between-group Difference                                  | Adjusted Factors |
|-------------------------|----------------|-------|-------------------------------------|--|--|---------------|------------------------------------|--------------|-------------------------|---|------------------|
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 1 | WIC participant                     | % of children with saturated fat above guideline | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 161           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref   | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 2 | Non WIC Participants, lower income  | % of children with saturated fat above guideline | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 135           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 67.2 (SE 4.7), p≤0.05  | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 3 | Non WIC Participants, higher income | % of children with saturated fat above guideline | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 300           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 71.6 (SE 2.3), p≤0.001 | NR               |

| Author, Year               | Subgroup | Arm   | Arm Name  | Outcome Definition | Tool                               | N at Analysis                          | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|---|--------------------|------------------------------------|--|--|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR       | Arm 1 | WIC Participant at 24 months                          | Fat, total         | 24-hour dietary recall - USDA AMPM | unweighted = 1,667; weighted = 312,434 | Followup timepoint: Dietary data in 2016 - questionnaire<br>NR | g/d          | NR                      | Comparator: 1<br>Mean difference from baseline: 49.6 (SE 1), p=NR   | maternal age, race/ethnicity, language, employment status at 13 months, maternal education, poverty level at 13 months, and household size. |
| Hamner, 2019 <sup>32</sup> | NR       | Arm 2 | Non-WIC Participant at 24 months (but was previously) | Fat, total         | 24-hour dietary recall - USDA AMPM | unweighted = 771; unweighted = 126,586 | Followup timepoint: Dietary data in 2016 - questionnaire<br>NR | g/d          | NR                      | Comparator: 2<br>Mean difference from baseline: 55.2 (SE 1.2), p=NR | maternal age, race/ethnicity, language, employment status at 13 months, maternal education, poverty level at 13 months, and household size. |

| Author, Year               | Subgroup | Arm   | Arm Name  | Outcome Definition | Tool                               | N at Analysis                          | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|---|--------------------|------------------------------------|--|--|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR       | Arm 1 | WIC Participant at 24 months                          | Fat, total         | 24-hour dietary recall - USDA AMPM | unweighted = 1,667; weighted = 312,434 | Followup timepoint: Dietary data in 2016 - questionnaire<br>NR | g/d          | NR                      | Comparator: 1<br>Mean difference from baseline: 20.8 (SE 0.6), p=NR | maternal age, race/ethnicity, language, employment status at 13 months, maternal education, poverty level at 13 months, and household size. |
| Hamner, 2019 <sup>32</sup> | NR       | Arm 2 | Non-WIC Participant at 24 months (but was previously) | Fat, total         | 24-hour dietary recall - USDA AMPM | unweighted = 771; unweighted = 126,586 | Followup timepoint: Dietary data in 2016 - questionnaire<br>NR | g/d          | NR                      | Comparator: 2<br>Mean difference from baseline: 19.7 (SE 0.8), p=NR | maternal age, race/ethnicity, language, employment status at 13 months, maternal education, poverty level at 13 months, and household size. |



| Author, Year               | Subgroup | Arm   | Arm Name  | Outcome Definition | Tool                               | N at Analysis                          | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|---|--------------------|------------------------------------|--|--|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR       | Arm 1 | WIC Participant at 24 months                          | Fat, total         | 24-hour dietary recall - USDA AMPM | unweighted = 1,667; weighted = 312,434 | Followup timepoint: Dietary data in 2016 - questionnaire<br>NR | g/d          | NR                      | Comparator: 1 % difference from baseline: 43.4 (SE 1.1), p=0.03 | maternal age, race/ethnicity, language, employment status at 13 months, maternal education, poverty level at 13 months, and household size. |
| Hamner, 2019 <sup>32</sup> | NR       | Arm 2 | Non-WIC Participant at 24 months (but was previously) | Fat, total         | 24-hour dietary recall - USDA AMPM | unweighted = 771; unweighted = 126,586 | Followup timepoint: Dietary data in 2016 - questionnaire<br>NR | g/d          | NR                      | Comparator: 2 % difference from baseline: 36.8 (SE 1.4), p=0.03 | maternal age, race/ethnicity, language, employment status at 13 months, maternal education, poverty level at 13 months, and household size. |

n=sample size; NA=not available; NCI=National Cancer Institute; NR=not reported; p=p-value; Ref=reference; SE=standard error; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-203. Dietary intake continuous outcomes (fat) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup          | Arm     | Arm Name         | Outcome Definition | Tool                  | N                              | Followup Outcome   | Outcome unit | Within-group Difference                 | Between-group Difference | Adjusted Factors  |
|---------------------------------|-------------------|---------|------------------|--------------------|-----------------------|--------------------------------|--|--------------|---|--------------------------|---|
| Kong, 2014 <sup>19</sup>        | Children          | Arm 1   | Hispanic         | total fat          | 24-hour recall, NDSR  | Baseline: 112<br>Followup: 89  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 33.6 (SE 1.1)<br>Followup: Mean 30.1 (SE 1.2)   | %kcal        | % change from baseline: -0.105, p=0.002 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup>        | Children          | Arm 2   | African American | total fat          | 24-hour recall, NDSR  | Baseline: 97<br>Followup: 64   | Followup timepoint: 18 months after baseline<br>Baseline: Mean 31.6 (SE 2.7)<br>Followup: Mean 33.2 (SE 2.3)   | %kcal        | % change from baseline: -0.05, p=0.27   | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children | Overall | Overall          | Fat, % kcal        | 24 hour recall (NDSR) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 31.2 (SD 8.4)<br>Followup: Mean 29.7 (SD 8.7) | %kcal        | Mean change from baseline               | Comparator: NR           | 0   |

| Author, Year                    | Subgroup                  | Arm     | Arm Name     | Outcome Definition  | Tool                   | N                            | Followup Outcome   | Outcome unit | Within-group Difference   | Between-group Difference   | Adjusted Factors |
|---------------------------------|---------------------------|---------|--------------|---|------------------------|------------------------------|--|--------------|---------------------------|--|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall      | Fat, % kcal   | 24 hour recall (NDS R) | Baseline: 90<br>Followup: 90 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 35.4 (SD 8)<br>Followup: Mean 36.3 (SD 7.9) | %kcal        | Mean change from baseline | Comparator: NR   | 0                |
| Guthrie, 2020 <sup>65</sup>     | Age 24 to 47.9 months     | Arm 1   | 2008 non-WIC | % having more than Dietary Guideline for Americans recommendations (<10%) | NR                     | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 70<br>Followup: NR  | NR           | NR                        | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.0001$ | % FPL            |
| Guthrie, 2020 <sup>65</sup>     | Age 24 to 47.9 months     | Arm 2   | 2008 WIC     | % having more than Dietary Guideline for Americans recommendations (<10%) | NR                     | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 75<br>Followup: NR  | NR           | NR                        | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.0001$ | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome  | Outcome unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having more than Dietary Guideline for Americans recommendations (<10%) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 73<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.0001$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having more than Dietary Guideline for Americans recommendations (<10%) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 63<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.0001$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having more than Dietary Guideline for Americans recommendations (<10%) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 70<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : $p = \text{NR}$                                | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having more than Dietary Guideline for Americans recommendations (<10%) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 75<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : $p > 0.0001$  | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition  | Tool | N                            | Followup Outcome  | Outcome unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having more than Dietary Guideline for Americans recommendations (<10%) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 73<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having more than Dietary Guideline for Americans recommendations (<10%) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 63<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001      | % FPL            |

BMI=body mass index; FPL=federal poverty level; Kcal=kilocalories; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-204. Dietary intake continuous outcomes (fatty acid) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition | Tool | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|--------------------|------|---|--|--------------|-------------------------|--------------------------|---|
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC Participants | Fatty acids        | NR   | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 3.2 (NR)<br>Followup: Mean 3.7 (NR) | NR           | NR                      | Comparator: Ref          | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year               | Sub-group | Arm   | Arm Name         | Outcome Definition | Tool | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|-----------|-------|------------------|--------------------|------|---|--|--------------|-------------------------|---|---|
| Tester, 2016 <sup>45</sup> | NR        | Arm 2 | WIC Participants | Fatty acids        | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 2.8 (NR)<br>Followup: Mean 4.3 (NR) | NR           | NR                      | Comparator: Arm1<br>Ratio of Relative Changes: 1.3 (95% CI: 1.0 to 1.8), p=0.06 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

BMI=body mass index; BMR= basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; FPL=federal poverty level; Kcal=kilocalories; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-205. Dietary intake continuous outcomes (fatty acid) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year             | Sub-group | Arm   | Arm Name         | Outcome Definition | Tool                 | N                             | Followup Outcome   | Outcome Unit | Within-group Difference                  | Between-group Difference | Adjusted Factors  |
|--------------------------|-----------|-------|------------------|--------------------|----------------------|-------------------------------|--|--------------|--|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Children  | Arm 1 | Hispanic         | saturated fat      | 24-hour recall, NDSR | Baseline: 112<br>Followup: 89 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 12.5 (SE 0.5)<br>Followup: Mean 10.6 (SE 0.6) | %kcal        | % change from baseline: -0.153, p=0.0004 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Children  | Arm 2 | African American | saturated fat      | 24-hour recall, NDSR | Baseline: 97<br>Followup: 64  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 11 (SE 1.2)<br>Followup: Mean 10.6 (SE 1.1)   | %kcal        | % change from baseline: -0.036, p=0.55   | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |



| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition             | Tool  | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|-----------|--------------------------------|---|-------------------------------|---|--------------|-------------------------|--------------------------|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 1 | Fall 2008 | saturated fat in grams per day | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 22.31 g (SE 0.05)<br>Followup: NR | g/day        | NR                      | Comparator: Ref          | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                | Sub-group | Arm   | Arm Name    | Outcome Definition             | Tool  | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-----------------------------|-----------|-------|-------------|--------------------------------|---|-------------------------------|---|--------------|-------------------------|--|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 2 | Spring 2010 | saturated fat in grams per day | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 19.99 g (SE 0.05)<br>Followup: NR | g/day        | NR                      | Comparator: 1 vs. 2<br>means ratio: 0.9 (95% CI: 0.84 to 0.97), p<0.01 | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition                       | Tool  | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|-----------|--|---|-------------------------------|---|--------------|-------------------------|--------------------------|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 1 | Fall 2008 | saturated fat in grams % of total energy | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.12 (SE 0)<br>Followup: NR | %            | NR                      | Comparator: Ref          | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                    | Sub-group         | Arm     | Arm Name    | Outcome Definition                       | Tool  | N                              | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference   | Adjusted Factors  |
|---------------------------------|-------------------|---------|-------------|--|---|--------------------------------|--|--------------|---------------------------|--|---|
| Morshed, 2015 <sup>71</sup>     | NR                | Arm 2   | Spring 2010 | saturated fat in grams % of total energy | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR  | Followup timepoint: NR<br>Baseline: Mean: 0.11 (SE 0)<br>Followup: NR  | %            | NR                        | Comparator: 1 vs. 2<br>means ratio: 1 (95% CI: 0.99 to 1),<br>p>0.05 | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children | Overall | Overall     | Saturated fat, % kcal                    | 24 hour recall (NDSR)                                 | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 12.1 (SD 3.6)<br>Followup: Mean 10.9 (SD 3.8) | %kcal        | Mean change from baseline | Comparator: NR   | NR  |

| Author, Year                    | Sub-group                 | Arm     | Arm Name | Outcome Definition    | Tool                  | N                            | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|-----------------------|-----------------------|------------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | Saturated fat, % kcal | 24 hour recall (NDSR) | Baseline: 90<br>Followup: 90 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 12.6 (SD 4.1)<br>Followup: Mean 12.2 (SD 3.3) | %kcal        | Mean change from baseline | Comparator: NR           | NR               |

BMI=body mass index; BMR= basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; FPL=federal poverty level; Kcal=kilocalories; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-206. Dietary intake categorical outcomes (sodium) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group      | Arm   | Arm Name                            | Outcome Definition                          | Tool | N at Analysis | Followup Outcome, n(%)             | Outcome Unit | Within-group Difference | Between-group Difference                                | Adjusted Factors |
|-------------------------|----------------|-------|-------------------------------------|---|------|---------------|------------------------------------|--------------|-------------------------|---|------------------|
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 1 | WIC participant                     | % of children with intake above upper limit | NR   | 380           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref   | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 2 | Non WIC Participants, lower income  | % of children with intake above upper limit | NR   | 233           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 46 (SE 2.8), p=NR    | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 3 | Non WIC Participants, higher income | % of children with intake above upper limit | NR   | 519           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 30.5 (SE 2), p≤0.001 | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 1 | WIC participant                     | % of children with intake above upper limit | NR   | 161           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Ref   | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 2 | Non WIC Participants, lower income  | % of children with intake above upper limit | NR   | 135           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 76.3 (SE 4.3), p=NR  | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 3 | Non WIC Participants, higher income | % of children with intake above upper limit | NR   | 300           | Followup timepoint: baseline<br>NR | NR           | NR                      | Comparator: Arm 1<br>Not reported: 68.9 (SE 2), p≤0.05  | NR               |

n=sample size; NA=not available; NCI=National Cancer Institute; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-207. Dietary intake continuous outcomes (sodium) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group | Arm   | Arm Name     | Outcome Definition                    | Tool                       | N                             | Followup Outcome                            | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|-------------------------|-----------|-------|--------------|---------------------------------------|----------------------------|-------------------------------|---|--------------|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup> | NR        | Arm 1 | WIC          | Sodium component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 4.2 (SE 0.3)<br>Followup: NR | NR           | NR                      | Comparator: Arm 2 & 3<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 2 | WIC-Eligible | Sodium component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR | Baseline: Mean 3.7 (SE 0.4)<br>Followup: NR | NR           | NR                      | Comparator: Arm 1 & 3<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition                    | Tool                       | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|---------------------------------------|----------------------------|---|--|--------------|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup>    | NR        | Arm 3 | Non-WIC              | Sodium component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR   | Baseline: Mean 5 (SE 0.4)<br>Followup: NR  | NR           | NR                      | Comparator: Arm 1 & 2<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC Participants | Sodium                                | NR                         | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 5.7 (SD NR)<br>Followup: Mean 6.1 (SD NR) | NR           | NR                      | Comparator: Ref                  | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |



| Author, Year               | Subgroup | Arm   | Arm Name         | Outcome Definition | Tool | N  | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|----------|-------|------------------|--------------------|------|--|--|--------------|-------------------------|--|---|
| Tester, 2016 <sup>45</sup> | NR       | Arm 2 | WIC Participants | Sodium             | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719 Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012), Baseline: Mean 6.1 (SD NR) Followup: Mean 6.3 (SD NR) | NR           | NR                      | Comparator: Arm1 Ratio of Relative Changes: 1 (95% CI: 0.9 to 1.1), p=0.84 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

CI=confidence interval; FPL=federal poverty level; IQR=interquartile range; Mg/d=milligram per day; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-208. Dietary intake continuous outcomes (sodium) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                 | Sub-group               | Arm   | Arm Name | Outcome Definition | Tool                                | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|-------------------------|-------|----------|--------------------|-------------------------------------|------------------------------|---|--------------|-------------------------|--|--|
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 1 | 2009     | sodium intake /day | 24-hr recall, NDS R, first day only | Baseline: 34<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 323.4<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 323.4 (IQR: 998.4), p=REF    | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |
| Thornton, 2014 <sup>76</sup> | toddlers 12-23.9 months | Arm 2 | 2011     | sodium intake /day | 24-hr recall, NDS R, first day only | Baseline: 40<br>Followup: NR | Followup timepoint: NR<br>Baseline: Median: 451.4<br>Followup: NR | milligrams/d | NR                      | Comparator: 1 vs. 2 difference (text states diff in mean; table is labeled median): 451.4 (IQR: 1192.7), p=0.039 | Day of intake; for the child: race, health insurance status, and food intake before 4 months of age; and for the caregiver: country of origin, age, education level, employment status, race, body mass index, insurance status, and language spoken at home |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 59<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.62 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 66<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.62 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 57<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.62 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 62<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.62 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 59<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 66<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 57<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 62<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 82<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.21 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 83<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.21 | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 88<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.21 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 85<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.21 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 82<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 83<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 88<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                  | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name | Outcome Definition   | Tool | N                            | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference          | Adjusted Factors |
|-----------------------------|-----------------------|-------|----------|--|------|------------------------------|---|--------------|-------------------------|-----------------------------------|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC | % having less more than Chronic Disease Risk Reduction guidelines (1200 mg/dL) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 85<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001 | % FPL            |

CI=confidence interval; FPL=federal poverty level; IQR=interquartile range; Mg/d=milligram per day; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-209. Dietary intake categorical outcomes (protein food group) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition | Tool                               | N at Analysis | Followup Outcome , n(%)   | Outcome Unit | Within-group Difference | Between-group Difference                  | Adjusted Factors  |
|----------------------------|-----------|-------|--|--------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Total Protein      | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (80.5) | NR           | NR                      | Comparator: 1 (95% CI: 74.5-85.3), p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Total Protein      | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR        | NR           | NR                      | Comparator: 2 p=NR                        | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

| Author, Year               | Sub-group | Arm   | Arm Name                                      | Outcome Definition | Tool                               | N at Analysis | Followup Outcome , n(%)   | Outcome Unit | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|---|--------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits | Total Protein      | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (90) | NR           | NR                      | Comparator: 3 (95% CI: 80.0-95.3), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

CI=confidence interval; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-210. Dietary intake continuous outcomes (seafood and plant protein) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group | Arm   | Arm Name     | Outcome Definition                           | Tool                       | N                             | Followup Outcome                            | Outcome Unit | Within-group Difference | Between-group Difference                                  | Adjusted Factors  |
|-------------------------|-----------|-------|--------------|--|----------------------------|-------------------------------|---|--------------|-------------------------|---|---|
| Kay, 2021 <sup>35</sup> | NR        | Arm 1 | WIC          | Seafood component of Toddler DQI score       | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 0.2 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator : Arm 2 & 3<br>NR: NR (95% CI: NR),<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 2 | WIC-Eligible | Seafood component of Toddler DQI score       | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR | Baseline: Mean 0.2 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator : Arm 1 & 3<br>NR: NR (95% CI: NR),<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 3 | Non-WIC      | Seafood component of Toddler DQI score       | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR | Baseline: Mean 0.2 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator : Arm 1 & 2<br>NR: NR (95% CI: NR),<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 1 | WIC          | Plant protein component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 0.8 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator : Arm 2 & 3<br>NR: NR (95% CI: NR),<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition                           | Tool                       | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference                                  | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|--|----------------------------|---|--|--------------|-------------------------|---|---|
| Kay, 2021 <sup>35</sup>    | NR        | Arm 2 | WIC-Eligible         | Plant protein component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR   | Baseline: Mean 0.7 (SE 0.1)<br>Followup: NR  | NR           | NR                      | Comparator : Arm 1 & 3<br>NR: NR (95% CI: NR),<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 3 | Non-WIC              | Plant protein component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR   | Baseline: Mean 0.8 (SE 0.1)<br>Followup: NR  | NR           | NR                      | Comparator : Arm 1 & 2<br>NR: NR (95% CI: NR),<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC Participants | Seafood and plant proteins                   | NR                         | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 1.6 (SD NR)<br>Followup: Mean 1.2 (SD NR) | NR           | NR                      | Comparator : Ref  | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year                  | Sub-group | Arm   | Arm Name         | Outcome Definition         | Tool     | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|------------------|----------------------------|----------|---|--|--------------|-------------------------|---|---|
| Tester, 2016 <sup>45</sup>    | NR        | Arm 2 | WIC Participants | Seafood and plant proteins | NR       | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 1.5 (SD NR)<br>Followup: Mean 1.7 (SD NR) | NR           | NR                      | Comparator : Arm1<br>Ratio of Relative Changes: 1.3 (95% CI: 0.9 to 2.1),<br>p=0.18 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |
| Weinfield, 2020 <sup>48</sup> | NR        | Arm 1 | WIC Duration Low | Seafood and plant proteins | HEI-2015 | Baseline: 59<br>Followup: NR  | Followup timepoint: ≤4 interviews<br>Baseline: NR<br>Followup: NR  | NR           | NR                      | Comparator : Ref  | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced                                  |

| Author, Year                  | Sub-group | Arm   | Arm Name                  | Outcome Definition         | Tool     | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|-----------|-------|---------------------------|----------------------------|----------|-------------------------------|--|--------------|-------------------------|---|--|
| Weinfield, 2020 <sup>48</sup> | NR        | Arm 2 | WIC Duration Intermediate | Seafood and plant proteins | HEI-2015 | Baseline: 207<br>Followup: NR | Followup timepoint: 5-7 interviews<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Arm 1<br>Beta coefficient: 0.19 (95% CI: -0.03 to 0.41),<br>p=0.08 | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |
| Weinfield, 2020 <sup>48</sup> | NR        | Arm 3 | WIC Duration High         | Seafood and plant proteins | HEI-2015 | Baseline: 957<br>Followup: NR | Followup timepoint: 5-7 interviews<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator : Arm 1<br>Beta coefficient: 0.21 (95% CI: 0.02 to 0.39),<br>p=0.03  | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-211. Dietary intake continuous outcomes (total proteins food) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition                            | Tool                       | N   | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference                              | Adjusted Factors   |
|----------------------------|-----------|-------|----------------------|---|----------------------------|---|---|--------------|-------------------------|---|--|
| Kay, 2021 <sup>35</sup>    | NR        | Arm 1 | WIC                  | Total proteins component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR   | Baseline: Mean 3.9 (SE 0.1)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 2 & 3<br>NR: NR (95% CI: NR), p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings                |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 2 | WIC-Eligible         | Total proteins component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR   | Baseline: Mean 4 (SE 0.2)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1 & 3<br>NR: NR (95% CI: NR), p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings                |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 3 | Non-WIC              | Total proteins component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR   | Baseline: Mean 3.7 (SE 0.1)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1 & 2<br>NR: NR (95% CI: NR), p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings                |
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC Participants | Total protein foods                           | NR                         | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012), Baseline: Mean 3.6 (SD NR) | NR           | NR                      | Comparator: Ref                                       | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household |

|                               |                     |          |  |                                       |    |   |  |       |                 |  |   |
|-------------------------------|---------------------|----------|--|---------------------------------------|----|---|--|-------|-----------------|--|---|
|                               |                     |          |  |                                       |    |   | Followup:<br>Mean 3.6<br>(SD NR)   |       |                 |  | income-to-poverty<br>ratio and<br>household food<br>security status   |
| Tester,<br>2016 <sup>45</sup> | NR                  | Arm<br>2 | WIC<br>Participa<br>nts                | Total protein foods                   | NR | Baseline:<br>Before<br>WIC<br>Food<br>Package<br>Change<br>(2003–<br>2008):<br>719<br>Followup:<br>NR | Followup<br>timepoint:<br>After WIC<br>Food<br>Package<br>Change<br>(2011–<br>2012),<br>Baseline:<br>Mean 3.6<br>(SD NR)<br>Followup:<br>Mean 3.8<br>(SD NR) | NR    | NR              | Comparator: Arm1<br>Ratio of Relative<br>Changes: 1.1 (95%<br>CI: 0.9 to 1.3),<br>p=0.46 | Age,<br>race/ethnicity,<br>gender, and<br>weight status and<br>energy intake of<br>the child;<br>education and<br>marital status of<br>the household<br>respondent; and<br>household<br>income-to-poverty<br>ratio and<br>household food<br>security status |
| Zimmer,<br>2020 <sup>50</sup> | Age<br>2-4<br>years | Arm<br>1 | Higher<br>income<br>children           | Mean intake of total<br>protein foods | NA | Baseline:<br>360<br>Followup:<br>360  | 2011-<br>2014<br>Baseline:<br>NR<br>Followup:<br>Mean<br>1.96 (SE:<br>0.16)  | oz eq | Not<br>reported | Comparator: NA<br>p=NR   | NR  |
| Zimmer,<br>2020 <sup>50</sup> | Age<br>2-4<br>years | Arm<br>2 | WIC<br>eligible<br>nonpartic<br>ipants | Mean intake of total<br>protein foods | NA | Baseline:<br>224<br>Followup:<br>224  | 2011-<br>2014<br>Baseline:<br>NR<br>Followup:<br>Mean 2.3<br>(SE:<br>0.23)   | oz eq | Not<br>reported | Comparator: NA<br>p=NR   | NR  |
| Zimmer,<br>2020 <sup>50</sup> | Age<br>2-4<br>years | Arm<br>3 | WIC<br>Participa<br>nts                | Mean intake of total<br>protein foods | NA | Baseline:<br>463<br>Followup:<br>463  | 2011-<br>2014<br>Baseline:<br>NR<br>Followup:<br>Mean<br>2.13 (SE:<br>0.08)  | oz eq | Not<br>reported | Comparator: NA<br>p=NR   | NR  |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-212. Dietary intake continuous outcomes (beans and peas as protein food) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                  | Subgroup | Arm   | Arm Name                  | Outcome Definition            | Tool                      | N                             | Followup Outcome   | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|----------|-------|---------------------------|-------------------------------|---------------------------|-------------------------------|--|-------------------------|---|--|
| Weinfield, 2020 <sup>48</sup> | NR       | Arm 1 | WIC Duration Low          | Cup equivalents, standardized | 24HR dietary recall, AMPM | Baseline: 59<br>Followup: NR  | Followup timepoint: ≤4 interviews<br>Baseline: NR<br>Followup: NR  | NR                      | Comparator: Ref   | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |
| Weinfield, 2020 <sup>48</sup> | NR       | Arm 2 | WIC Duration Intermediate | Cup equivalents, standardized | 24HR dietary recall, AMPM | Baseline: 207<br>Followup: NR | Followup timepoint: 5-7 interviews<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Beta coefficient: 0.03 (95% CI: -0.14 to 0.19), p=0.75 | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |
| Weinfield, 2020 <sup>48</sup> | NR       | Arm 3 | WIC Duration High         | Cup equivalents, standardized | 24HR dietary recall, AMPM | Baseline: 957<br>Followup: NR | Followup timepoint: 5-7 interviews<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Arm 1<br>Beta coefficient: 0.04 (95% CI: -0.10 to 0.19), p=0.55 | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |

AMPM= Automated Multiple-Pass Method CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-213. Dietary intake categorical outcomes (added sugars) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group      | Arm   | Arm Name                            | Outcome Definition                                    | Tool   | N at Analysis | Followup Outcome, n(%)             | Within-group Difference | Between-group Difference                                 | Adjusted Factors |
|-------------------------|----------------|-------|-------------------------------------|---|--|---------------|------------------------------------|-------------------------|--|------------------|
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 1 | WIC participant                     | % of children with added sugar intake about guideline | NR   | 380           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Ref  | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 2 | Non WIC participants, lower income  | % of children with added sugar intake about guideline | NR   | 233           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Arm 1<br>Not reported: 2.4 (SE 0.8), p≤0.001 | NR               |
| Jun, 2018 <sup>34</sup> | 12-23.9 months | Arm 3 | Non WIC participants, higher income | % of children with added sugar intake about guideline | NR   | 519           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Arm 1<br>Not reported: 2 (SE 0.8), p≤0.001   | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 1 | WIC participant                     | % of children with added sugar intake about guideline | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 161           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Ref  | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 2 | Non WIC participants, lower income  | % of children with added sugar intake about guideline | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 135           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Arm 1<br>Not reported: 11.1 (SE 2.9), p=NR   | NR               |
| Jun, 2018 <sup>34</sup> | 24-47.9 months | Arm 3 | Non WIC participants, higher income | % of children with added sugar intake about guideline | 24 hour recall and then used NCI method to characterize usual intake distribution and then weighted regression | 300           | Followup timepoint: baseline<br>NR | NR                      | Comparator: Arm 1<br>Not reported: 8.8 (SE 2.3), p≤0.05  | NR               |

CI=confidence interval; n=sample size; NA=not available; NCI=National Cancer Institute; NR=not reported; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-214. Dietary intake continuous outcomes (added sugars) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group | Arm   | Arm Name     | Outcome Definition                          | Tool                       | N                             | Followup Outcome                            | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|-------------------------|-----------|-------|--------------|---|----------------------------|-------------------------------|---|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup> | NR        | Arm 1 | WIC          | Added sugars component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 2.4 (SE 0.2)<br>Followup: NR | NR                      | Comparator: Arm 2 & 3<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 2 | WIC-Eligible | Added sugars component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR | Baseline: Mean 2.2 (SE 0.3)<br>Followup: NR | NR                      | Comparator: Arm 1 & 3<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 3 | Non-WIC      | Added sugars component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR | Baseline: Mean 2.3 (SE 0.2)<br>Followup: NR | NR                      | Comparator: Arm 1 & 2<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |

CI=confidence interval; FPL=federal poverty level; n=sample size; NA=not available; NASEM= National Academies of Sciences, Engineering, and Medicine; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-215. Dietary intake continuous outcomes (added sugars) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                                   | Tool | N                            | Followup Outcome   | Outcome unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|--|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 7.1<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p<0.0001 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 6.7<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p<0.0001 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 2.4<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p<0.0001 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 8.1<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p<0.0001 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 7.1<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                    | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 6.7<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                                   | Tool | N                            | Followup Outcome   | Outcome unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|--|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 2.4<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                    | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 8.1<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p≤0.0001   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 16<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p≤0.0001 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 8<br>Followup: NR   | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p≤0.0001 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 10<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p≤0.0001 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 14<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p≤0.0001 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 16<br>Followup: NR  | NR           | NR                      | Comparator: Not applicable<br>% : p=NR                                    | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition                                   | Tool | N                            | Followup Outcome  | Outcome unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|------------------------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 8<br>Followup: NR  | NR           | NR                      | Comparator: Arm 1<br>% : p>0.0001      | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 10<br>Followup: NR | NR           | NR                      | Comparator: Not applicable<br>% : p=NR | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | % having more than NASEM guidelines (<25% of energy) | NR   | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: %: 14<br>Followup: NR | NR           | NR                      | Comparator: Arm 3<br>% : p>0.0001      | % FPL            |

CI=confidence interval; FPL=federal poverty level; n=sample size; NA=not available; NASEM= National Academies of Sciences, Engineering, and Medicine; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-216. Dietary intake categorical outcomes (desserts) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (89) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.93 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (85) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.93 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (91) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.93 | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (88) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.93 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (89) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (85) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (91) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|----------|---|------|---------------|-----------------------------------|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (88) | Any          | NR                      | Comparator: Arm 3<br>% : $p \geq 0.05$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (85) | Any          | NR                      | Comparator: Ref                        | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (88) | Any          | NR                      | Comparator: Arm 2<br>% : $p \geq 0.05$ | % FPL            |

n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-217. Dietary intake categorical outcomes (sugar sweetened beverages) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition        | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|--|---------------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Sugar Sweetened Beverages | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (31.1) | NR           | NR                      | Comparator: 1 (95% CI: 24.2-39.0), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Sugar Sweetened Beverages | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (26.6) | NR           | NR                      | Comparator: 2 (95% CI: 15.5-41.6), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits                | Sugar Sweetened Beverages | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (24.4) | NR           | NR                      | Comparator: 3 (95% CI: 14.8-37.6), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

| Author, Year                | Sub-group       | Arm   | Arm Name                | Outcome Definition        | Tool                          | N at Analysis | Followup Outcome, n(%)                                  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------|-------|-------------------------|---------------------------|-------------------------------|---------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 1 | WIC Participant         | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (10) | NR           | NR                      | Comparator: 1<br>OR: NR (95% CI: NR), p=NR                      | 0                |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 2 | Non-WIC - Lower income  | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (11) | NR           | NR                      | Comparator: 2<br>OR: 0.88 (1 vs. 2) (95% CI: 0.41, 1.88 ), p=NR | 0                |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 3 | Non-WIC - Higher Income | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (4)  | NR           | NR                      | Comparator: 3<br>OR: 2.67 (1 vs. 3) (95% CI: 1.22, 5.87 ), p=NR | 0                |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 1 | WIC Participant         | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (34) | NR           | NR                      | Comparator: 1<br>OR: NR (95% CI: NR), p=NR                      | 0                |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 2 | Non-WIC - Lower income  | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (34) | NR           | NR                      | Comparator: 2<br>OR: 1 (1 vs. 2) (95% CI: 0.65, 1.53 ), p=NR    | 0                |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 3 | Non-WIC - Higher Income | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (20) | NR           | NR                      | Comparator: 3<br>OR: 2.03 (1 vs. 3) (95% CI: 1.38, 2.99 ), p=NR | 0                |

| Author, Year                | Sub-group     | Arm   | Arm Name                | Outcome Definition        | Tool                          | N at Analysis | Followup Outcome, n(%)                                  | Outcome Unit | Within-group Difference | Between-group Difference                                   | Adjusted Factors |
|-----------------------------|---------------|-------|-------------------------|---------------------------|-------------------------------|---------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2018 <sup>31</sup> | child 24-47.9 | Arm 1 | WIC Participant         | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (43) | NR           | NR                      | Comparator: OR: NR (95% CI: NR), p=NR                      | 0                |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9 | Arm 2 | Non-WIC - Lower income  | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (65) | NR           | NR                      | Comparator: OR: 0.4 (1 vs. 2) (95% CI: 0.22, 0.73 ), p=NR  | 0                |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9 | Arm 3 | Non-WIC - Higher Income | Sugar-sweetened beverages | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (38) | NR           | NR                      | Comparator: OR: 1.22 (1 vs. 3) (95% CI: 0.74, 2.03 ), p=NR | 0                |

CI=confidence interval; FPL=federal poverty level; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-218. Dietary intake categorical outcomes (sugar sweetened beverages) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (25) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.26 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (34) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.26 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (25) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.26 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (26) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.26 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (25) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (34) | Any          | NR                      | Comparator: Arm 1<br>% : $p \geq 0.05$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (25) | Any          | NR                      | Comparator: Ref                        | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (26) | Any          | NR                      | Comparator: Arm 3<br>% : $p \geq 0.05$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (34) | Any          | NR                      | Comparator: Ref                        | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (26) | Any          | NR                      | Comparator: Arm 2<br>% : $p \geq 0.05$ | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (48) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.63 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (45) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.63 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (46) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.63 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (39) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.63 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (48) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference        | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|---------------------------------|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (45) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (46) | Any          | NR                      | Comparator: Ref                 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (39) | Any          | NR                      | Comparator: Arm 3<br>% : p≥0.05 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (45) | Any          | NR                      | Comparator: Ref                 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Includes soft drinks, fruit-flavored drinks, tea and coffee, and sports drinks. Excludes 100% fruit juice | NR   | NR            | Followup timepoint: NR<br>NR (39) | Any          | NR                      | Comparator: Arm 2<br>% : p≥0.05 | % FPL            |

CI=confidence interval; FPL=federal poverty level; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-219. Dietary intake continuous outcomes (sugar sweetened beverages) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Sub-group         | Arm     | Arm Name         | Outcome Definition  | Tool                 | N                              | Followup Outcome   | Outcome Unit                       | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|---------------------------------|-------------------|---------|------------------|---|----------------------|--------------------------------|--|------------------------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup>        | Children          | Arm 1   | Hispanic         | SSB intake (one serving = 8fl oz)   | 24-hour recall, NDSR | Baseline: 112<br>Followup: 89  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.4 (SD NR)<br>Followup: Mean 0.45 (SD NR)  | % > 0 servings / day               | % change from baseline: p>0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup>        | Children          | Arm 2   | African American | SSB intake (one serving = 8fl oz)   | 24-hour recall, NDSR | Baseline: 97<br>Followup: 64   | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.36 (SD NR)<br>Followup: Mean 0.59 (SD NR)   | % > 0 servings / day               | % change from baseline: p<0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children | Overall | Overall          | includes sweetened soft drinks, fruit drinks, tea, coffee, coffee substitutes, water, and nondairy supplements, including sports drinks. One serving is 8 fluid ounces. | 24 hour recall (NDS) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.4 (SD 0.6)<br>Followup: Mean 0.4 (SD 0.6) | serving/day (one serving is 1 cup) | Mean change from baseline      | Comparator: NR           | 0   |



| Author, Year                    | Sub-group                 | Arm     | Arm Name | Outcome Definition  | Tool                 | N                            | Followup Outcome   | Outcome Unit                       | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|---|----------------------|------------------------------|--|------------------------------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | includes sweetened soft drinks, fruit drinks, tea, coffee, coffee substitutes, water, and nondairy supplements, including sports drinks. One serving is 8 fluid ounces. | 24 hour recall (NDS) | Baseline: 90<br>Followup: 90 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.6 (SD 0.8)<br>Followup: Mean 0.8 (SD 1.2) | serving/day (one serving is 1 cup) | Mean change from baseline | Comparator: NR           | 0                |

BMI=body mass index; f/u=followup; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance Program; SSB=sugar sweetened beverage; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-220. Dietary intake categorical outcomes (vegetables) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition                         | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                  | Adjusted Factors  |
|----------------------------|-----------|-------|--|--|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Total Vegetable [Excluding white potatoes] | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (60.4) | NR           | NR                      | Comparator: 1 (95% CI: 52.2-68.0), p=NR   | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Total Vegetable [Excluding white potatoes] | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (42.3) | NR           | NR                      | Comparator: 2 (95% CI: 30.5-55.0), p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition                         | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|--|--|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits                | Total Vegetable [Excluding white potatoes] | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (58.1) | NR           | NR                      | Comparator: 3 (95% CI: 46.6-68.7), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Total Vegetables                           | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (26.5) | NR           | NR                      | Comparator: 1 (95% CI: 20.6-33.4), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Total Vegetables                           | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (24.4) | NR           | NR                      | Comparator: 2 (95% CI: 16.4-34.6), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

| Author, Year                | Sub-group       | Arm   | Arm Name                                      | Outcome Definition       | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                                     | Adjusted Factors  |
|-----------------------------|-----------------|-------|---|--------------------------|------------------------------------|---------------|---|--------------|-------------------------|--|---|
| Hamner, 2019 <sup>32</sup>  | NR              | Arm 3 | Children not eligible to receive WIC benefits | Total Vegetables         | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (20.9) | NR           | NR                      | Comparator: 3 (95% CI: 13.3-31.3), p=NR                      | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 1 | WIC Participant                               | Any vegetable            | 24-hour dietary recall - NDSR      | 375           | Followup timepoint: 2016 cross-sectional survey NR (74)                                 | NR           | NR                      | Comparator: 1 OR: NR (95% CI: NR), p=NR                      | NR  |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 2 | Non-WIC - Lower income                        | Any vegetable            | 24-hour dietary recall - NDSR      | 169           | Followup timepoint: 2016 cross-sectional survey NR (61)                                 | NR           | NR                      | Comparator: 2 OR: 1.76 (1 vs. 2) (95% CI: 1.12, 2.77 ), p=NR | NR  |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 3 | Non-WIC - Higher Income                       | Any vegetable            | 24-hour dietary recall - NDSR      | 357           | Followup timepoint: 2016 cross-sectional survey NR (72)                                 | NR           | NR                      | Comparator: 3 OR: 1.06(1 vs. 3) (95% CI: 0.73, 1.57 ), p=NR  | NR  |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 1 | WIC Participant                               | Any vegetable (WIC food) | 24-hour dietary recall - NDSR      | 375           | Followup timepoint: 2016 cross-sectional survey NR (71)                                 | NR           | NR                      | Comparator: 1 OR: NR (95% CI: NR), p=NR                      | NR  |

| Author, Year                | Sub-group       | Arm   | Arm Name                | Outcome Definition       | Tool                          | N at Analysis | Followup Outcome, n(%)                                  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------|-------|-------------------------|--------------------------|-------------------------------|---------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 2 | Non-WIC - Lower income  | Any vegetable (WIC food) | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (72) | NR           | NR                      | Comparator: 2<br>OR: 0.94 (1 vs. 2) (95% CI: 0.59, 1.49 ), p=NR | NR               |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 3 | Non-WIC - Higher Income | Any vegetable (WIC food) | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (75) | NR           | NR                      | Comparator: 3<br>OR: 0.82(1 vs. 3) (95% CI: 0.56, 1.21 ), p=NR  | NR               |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 1 | WIC Participant         | Any vegetable (WIC food) | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (69) | NR           | NR                      | Comparator: OR: NR (95% CI: NR), p=NR                           | NR               |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 2 | Non-WIC - Lower income  | Any vegetable (WIC food) | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (78) | NR           | NR                      | Comparator: OR: 0.64 (1 vs. 2) (95% CI: 0.32, 1.24 ), p=NR      | NR               |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 3 | Non-WIC - Higher Income | Any vegetable (WIC food) | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (74) | NR           | NR                      | Comparator: OR: 0.81 (1 vs. 3) (95% CI: 0.45, 1.45 ), p=NR      | NR               |

CI=confidence interval; FPL=federal poverty level; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-221. Dietary intake categorical outcomes (vegetables) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group            | Arm   | Arm Name     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|--|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.03 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (59) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.03 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (69) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.03 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (74) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.03 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (59) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 3 | 2016 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (69) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (74) | Any          | NR                      | Comparator: Arm 3<br>% : $p \geq 0.05$                                    | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (59) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (74) | Any          | NR                      | Comparator: Arm 2<br>% : $p \geq 0.05$                                    | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.64$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.64$ | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (74) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.64 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (70) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.64 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (74) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (70) | Any          | NR                      | Comparator: Arm 3<br>% : p≥0.05   | % FPL            |



| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (70) | Any          | NR                      | Comparator: Arm 2<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (70) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.48 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (68) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.48 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (75) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.48 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (68) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.48 | % FPL            |

| Author, Year                 | Sub-group             | Arm   | Arm Name     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                   | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|------------------------------|-----------------------|-------|--------------|--|------|---------------|--|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup>  | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (70)        | Any          | NR                      | Comparator: Ref                        | % FPL            |
| Guthrie, 2020 <sup>65</sup>  | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (68)        | Any          | NR                      | Comparator: Arm 1<br>% : $p \geq 0.05$ | % FPL            |
| Guthrie, 2020 <sup>65</sup>  | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (75)        | Any          | NR                      | Comparator: Ref                        | % FPL            |
| Guthrie, 2020 <sup>65</sup>  | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (68)        | Any          | NR                      | Comparator: Arm 3<br>% : $p \geq 0.05$ | % FPL            |
| Guthrie, 2020 <sup>65</sup>  | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (68)        | Any          | NR                      | Comparator: Ref                        | % FPL            |
| Guthrie, 2020 <sup>65</sup>  | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Includes dark green, orange, red, starchy and other vegetables, white potatoes | NR   | NR            | Followup timepoint: NR<br>NR (68)        | Any          | NR                      | Comparator: Arm 2<br>% : $p \geq 0.05$ | % FPL            |
| Ishtdorj, 2013 <sup>66</sup> | NR                    | Arm 1 | Pre-2009     | Four or more times per day   | NA   | 766           | Followup timepoint: Baseline<br>NR (3.9) | NA           | NR                      | Comparator: NR                         | 0                |

| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition         | Tool | N at Analysis | Followup Outcome, n(%)                 | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------|-------|-----------|----------------------------|------|---------------|--|--------------|-------------------------|---|------------------|
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | Four or more times per day | NA   | 876           | Followup timepoint: Baseline NR (8)    | NA           | NR                      | Comparator: NR  | 0                |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | Three times per day        | NA   | 766           | Followup timepoint: Baseline NR (11.3) | NA           | NR                      | Comparator: NR  | 0                |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | Three times per day        | NA   | 876           | Followup timepoint: Baseline NR (12.5) | NA           | NR                      | Comparator: NR  | 0                |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | Two or more times per day  | NA   | 766           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: Ref   | 0                |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | Two or more times per day  | NA   | 876           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: 2 vs. 1<br>Mean difference from baseline: 1.8, p=NR | 0                |

CI=confidence interval; FPL=federal poverty level; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-222. Dietary intake continuous outcomes (dark vegetables) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group     | Arm   | Arm Name                     | Outcome Definition   | Tool | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|----------------------------|---------------|-------|------------------------------|--|------|--------------------------------|---|--------------|-------------------------|--------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Mean intake of dark green vegetables                                     | NA   | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.01 (SE 0.05)  | c eq         | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Mean intake of dark green vegetables                                     | NA   | Baseline: 224<br>Followup: 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean <0.01 (SE 0.04) | c eq         | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC participants             | Mean intake of dark green vegetables                                     | NA   | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.05 (SE 0.03)  | c eq         | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of dark green vegetables | NA   | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 3.3 (SE 3.4)    | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of dark green vegetables | NA   | Baseline: 224<br>Followup: 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 7.7 (SE 5.4)    | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Percent contribution to total food group intake of dark green vegetables | NA   | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 6.4 (SE 1.9)    | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |

c eq=equivalent concentration; CI=confidence interval; N=sample size; NA=not available; NR=not reported; p=p-value; SE=standard error; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-223. Dietary intake continuous outcomes (greens and beans) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year            | Sub-group | Arm   | Arm Name     | Outcome Definition                          | Tool                       | N                             | Followup Outcome                            | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|-------------------------|-----------|-------|--------------|---|----------------------------|-------------------------------|---|--------------|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup> | NR        | Arm 1 | WIC          | Greens/Beans component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 0.9 (SE 0.1)<br>Followup: NR | NR           | NR                      | Comparator: Arm 2 & 3<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup> | NR        | Arm 2 | WIC-Eligible | Greens/Beans component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR | Baseline: Mean 1.3 (SE 0.2)<br>Followup: NR | NR           | NR                      | Comparator: Arm 1 & 3<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition                          | Tool                       | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|---|----------------------------|---|--|--------------|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup>    | NR        | Arm 3 | Non-WIC              | Greens/Beans component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR   | Baseline: Mean 1.4 (SE 0.2)<br>Followup: NR  | NR           | NR                      | Comparator: Arm 1 & 2<br>p=>0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC participants | Greens and beans                            | NR                         | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 0.7 (SD NR)<br>Followup: Mean 0.6 (SD NR) | NR           | NR                      | Comparator: Ref                  | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year                  | Sub-group | Arm   | Arm Name         | Outcome Definition | Tool     | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-------------------------------|-----------|-------|------------------|--------------------|----------|---|--|--------------|-------------------------|---|---|
| Tester, 2016 <sup>45</sup>    | NR        | Arm 2 | WIC participants | Greens and beans   | NR       | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 0.8 (SD NR)<br>Followup: Mean 1.5 (SD NR) | NR           | NR                      | Comparator: Arm1<br>Ratio of Relative Changes: 3.4 (95% CI: 1.3 to 9.4), p=0.02 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |
| Weinfield, 2020 <sup>48</sup> | NR        | Arm 1 | WIC Duration Low | Greens and beans   | HEI-2015 | Baseline: 59<br>Followup: NR  | Followup timepoint: ≤4 interviews<br>Baseline: NR<br>Followup: NR  | NR           | NR                      | Comparator: Ref   | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced                                  |



| Author, Year                  | Sub-group     | Arm   | Arm Name                  | Outcome Definition                   | Tool     | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|-------------------------------|---------------|-------|---------------------------|--------------------------------------|----------|--------------------------------|--|--------------|-------------------------|---|--|
| Weinfield, 2020 <sup>48</sup> | NR            | Arm 2 | WIC Duration Intermediate | Greens and beans                     | HEI-2015 | Baseline: 207<br>Followup: NR  | Followup timepoint: 5-7 interviews<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>Beta coefficient: 0.06 (95% CI: -0.09 to 0.28), p=0.59 | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |
| Weinfield, 2020 <sup>48</sup> | NR            | Arm 3 | WIC Duration High         | Greens and beans                     | HEI-2015 | Baseline: 957<br>Followup: NR  | Followup timepoint: 5-7 interviews<br>Baseline: NR<br>Followup: NR | NR           | NR                      | Comparator: Arm 1<br>Beta coefficient: 0.09 (95% CI: 0.008 to 0.09), p=0.32 | Maternal race/ethnicity, child sex, maternal marital status at 24 months,, breastfeeding duration in the first 13 months, and child age when complementary foods were introduced |
| Zimmer, 2020 <sup>50</sup>    | Age 2-4 years | Arm 1 | Higher income children    | Mean intake of legumes as vegetables | NA       | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.03 (SE 0.02)         | c eq         | Not reported            | Comparator: NA<br>p=NR  | NR   |

| Author, Year               | Sub-group     | Arm   | Arm Name                     | Outcome Definition                   | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors |
|----------------------------|---------------|-------|------------------------------|--------------------------------------|------|--------------------------------|--|--------------|-------------------------|------------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Mean intake of legumes as vegetables | NA   | Baseline: 224<br>Followup: 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.01 (SE 0.02) | c eq         | Not reported            | Comparator: Arm 3<br>p=<0.01 | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC participants             | Mean intake of legumes as vegetables | NA   | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.07 (SE 0.01) | c eq         | Not reported            | Comparator: NA<br>p=NR       | NR               |

CI=confidence interval; HEI=healthy eating index; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-224. Dietary intake continuous outcomes (total other vegetables) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group     | Arm   | Arm Name                     | Outcome Definition  | Tool | N                                | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors |
|----------------------------|---------------|-------|------------------------------|---|------|----------------------------------|--|--------------|-------------------------|-----------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Mean intake of other vegetables                                     | NA   | Baseline : 360<br>Followup : 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.17 (SE 0.03) | c eq         | Not reported            | Comparator: NA<br>p=NR      | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Mean intake of other vegetables                                     | NA   | Baseline : 224<br>Followup : 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.08 (SE 0.02) | c eq         | Not reported            | Comparator: NA<br>p=NR      | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC participants             | Mean intake of other vegetables                                     | NA   | Baseline : 463<br>Followup : 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.13 (SE 0.02) | c eq         | Not reported            | Comparator: NA<br>p=NR      | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of other vegetables | NA   | Baseline : 360<br>Followup : 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 30.5 (SE 2.4)  | %            | Not reported            | Comparator: Arm 3<br>p<0.05 | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of other vegetables | NA   | Baseline : 224<br>Followup : 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 18.7 (SE 4.2)  | %            | Not reported            | Comparator: NA<br>p=NR      | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC participants             | Percent contribution to total food group intake of other vegetables | NA   | Baseline : 463<br>Followup : 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 24.8 (SE 1.8)  | %            | Not reported            | Comparator: NA<br>p=NR      | NR               |

c eq=equivalent concentration; CI=confidence interval; N=sample size; NA=not available; NR=not reported; p=p-value; SE=standard error; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-225. Dietary intake continuous outcomes (total vegetables) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition                 | Tool                       | N   | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|------------------------------------|----------------------------|---|---|--------------|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup>    | NR        | Arm 1 | WIC                  | Veg component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR   | Baseline: Mean 3.9 (SE 0.2)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 2 & 3<br>p=<0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 2 | WIC-Eligible         | Veg component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR   | Baseline: Mean 4.6 (SE 0.3)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1 & 3<br>p=<0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 3 | Non-WIC              | Veg component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR   | Baseline: Mean 4.8 (SE 0.3)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1 & 2<br>p=<0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC Participants | Total Vegetables                   | NR                         | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012), Baseline: Mean 2.3 (SD NR)<br>Followup: Mean 2.2 (SD NR) | NR           | NR                      | Comparator: Ref                  | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year                  | Sub-group | Arm   | Arm Name                        | Outcome Definition | Tool | N   | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-------------------------------|-----------|-------|---------------------------------|--------------------|------|---|--|-----------------|-------------------------|--|---|
| Tester, 2016 <sup>45</sup>    | NR        | Arm 2 | WIC Participants                | Total Vegetables   | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 2.3 (SD NR)<br>Followup: Mean 2.4 (SD NR) | NR              | NR                      | Comparator: Arm1<br>Ratio of Relative Changes: 1.1 (95% CI: 0.9 to 1.3),<br>p=0.47 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |
| Vercammen, 2018 <sup>47</sup> | NR        | Arm 1 | WIC Participants                | Total Vegetables   | NR   | Baseline: 677<br>Followup: NR   | Followup timepoint: NR<br>Baseline: Mean 0.65 (95% CI: 0.54 to 0.75)<br>Followup: NR                                       | cup-equivalents | NR                      | Comparator: p<0.05   | same as above   |
| Vercammen, 2018 <sup>47</sup> | NR        | Arm 2 | Income-eligible nonparticipants | Total Vegetables   | NR   | Baseline: 409<br>Followup: NR   | Followup timepoint: NR<br>Baseline: Mean 0.59 (95% CI: 0.47 to 0.70)<br>Followup: NR                                       | cup-equivalents | NR                      | Comparator: NR   | same as above   |

| Author, Year                  | Sub-group     | Arm   | Arm Name                      | Outcome Definition                                 | Tool | N                              | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|---------------|-------|-------------------------------|--|------|--------------------------------|--|-----------------|-------------------------|--------------------------|------------------|
| Vercammen, 2018 <sup>47</sup> | NR            | Arm 3 | Higher Income nonparticipants | Total Vegetables                                   | NR   | Baseline: 490<br>Followup: NR  | Followup timepoint: NR<br>Baseline: Mean 0.77 (95% CI: 0.66 to 0.87)<br>Followup: NR | cup-equivalents | NR                      | Comparator: NR           | same as above    |
| Zimmer, 2020 <sup>50</sup>    | Age 2-4 years | Arm 1 | Higher income children        | Mean intake of total vegetables, excluding legumes | NA   | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.52 (SE 0.08)                           | c eq            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup>    | Age 2-4 years | Arm 2 | WIC eligible nonparticipants  | Mean intake of total vegetables, excluding legumes | NA   | Baseline: 224<br>Followup: 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.39 (SE 0.13)                           | c eq            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup>    | Age 2-4 years | Arm 3 | WIC Participants              | Mean intake of total vegetables, excluding legumes | NA   | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.55 (SE 0.07)                           | c eq            | Not reported            | Comparator: NA<br>p=NR   | NR               |

BMI=body mass index; BMR= basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; FPL=federal poverty level; Kcal=kilocalories; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-226. Dietary intake continuous outcomes (total vegetables) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition                     | Tool  | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|-----------|--|---|-------------------------------|---|--------------|-------------------------|--------------------------|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 1 | Fall 2008 | vegetables (all kinds) in cups per day | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.95 cups (SE 0.05)<br>Followup: NR | cups/ day    | NR                      | Comparator: Ref          | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                | Sub-group | Arm   | Arm Name    | Outcome Definition  | Tool  | N                             | Followup Outcome   | Outcome Unit                       | Within-group Difference        | Between-group Difference  | Adjusted Factors  |
|-----------------------------|-----------|-------|-------------|---|---|-------------------------------|--|------------------------------------|--------------------------------|---|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 2 | Spring 2010 | vegetables (all kinds) in cups per day  | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.81 cups (SE 0.05)<br>Followup: NR                              | cups/ day                          | NR                             | Comparator: 1 vs. 2<br>means ratio: 0.93 (95% CI: 0.86 to 1.01), p>0.05 | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |
| Kong, 2014 <sup>19</sup>    | Children  | Arm 1 | Hispanic    | Vegetable intake (includes 1 cup raw leafy vegetables, 1/2 c other cooked or raw veg, or 1/2 c veg juice, excludes fried potatoes and vegetables) | 24-hour recall, NDSR                                  | Baseline: 112<br>Followup: 89 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.48 (SD NR)<br>Followup: Mean 0.53 (SD NR) | % > 0.5 servings / 1000 kcal / day | % change from baseline: p>0.05 | Comparator: NR  | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status   |



| Author, Year                | Sub-group | Arm   | Arm Name         | Outcome Definition  | Tool  | N                             | Followup Outcome   | Outcome Unit                       | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|------------------|---|---|-------------------------------|--|------------------------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup>    | Children  | Arm 2 | African American | Vegetable intake (includes 1 cup raw leafy vegetables, 1/2 c other cooked or raw veg, or 1/2 c veg juice, excludes fried potatoes and vegetables) | 24-hour recall, NDSR                                  | Baseline: 97<br>Followup: 64  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.59 (SD NR)<br>Followup: Mean 0.68 (SD NR) | % > 0.5 servings / 1000 kcal / day | % change from baseline: p>0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u   |
| Morshed, 2015 <sup>71</sup> | NR        | Arm 1 | Fall 2008        | vegetables without potatoes in cups per day   | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean 0.8 cups (SD 0.05)<br>Followup: NR                                | cups/ day                          | NR                             | Comparator: Ref          | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                | Sub-group | Arm   | Arm Name    | Outcome Definition                          | Tool  | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-----------------------------|-----------|-------|-------------|---|---|-------------------------------|--|--------------|-------------------------|---|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 2 | Spring 2010 | vegetables without potatoes in cups per day | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean 0.66 cups (SD 0.05)<br>Followup: NR | cups/ day    | NR                      | Comparator: 1 vs. 2<br>means ratio: 0.92 (95% CI: 0.85 to 1),<br>p<0.05 | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                    | Sub-group                 | Arm     | Arm Name | Outcome Definition  | Tool                 | N                              | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|---|----------------------|--------------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children         | Overall | Overall  | Includes all NDS vegetable food groups and avocado. One serving is 1 cup of raw leafy vegetables, 1/2 cup of other cooked or raw vegetables, or 1/2 cup of vegetable juice. | 24 hour recall (NDS) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 1.1 (SD 1.1)<br>Followup: Mean 1.3 (SD 1.6) | serving/day  | Mean change from baseline | Comparator: NR           | 0                |
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | Includes all NDS vegetable food groups and avocado. One serving is 1 cup of raw leafy vegetables, 1/2 cup of other cooked or raw vegetables, or 1/2 cup of vegetable juice. | 24 hour recall (NDS) | Baseline: 90<br>Followup: 90   | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.8 (SD 1)<br>Followup: Mean 1 (SD 1)       | serving/day  | Mean change from baseline | Comparator: NR           | 0                |

BMI=body mass index; BMR= basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; FPL=federal poverty level; Kcal=kilocalories; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-227. Dietary intake categorical outcomes (fruit juice) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name   | Outcome Definition | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                 | Adjusted Factors  |
|----------------------------|----------|-------|--|--------------------|------------------------------------|---------------|---|--------------|-------------------------|--|---|
| Hamner, 2019 <sup>32</sup> | NR       | Arm 1 | Children currently receiving WIC benefits                    | Fruit Juice        | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (70.6) | NR           | NR                      | Comparator: 1 (95% CI: 61.2-78.6), p≤005 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR       | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Fruit Juice        | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (51.6) | NR           | NR                      | Comparator: 2 (95% CI: 40.1-63.0), p≤005 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

| Author, Year                | Subgroup        | Arm   | Arm Name                                      | Outcome Definition | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                                   | Adjusted Factors  |
|-----------------------------|-----------------|-------|---|--------------------|------------------------------------|---------------|---|--------------|-------------------------|--|---|
| Hamner, 2019 <sup>32</sup>  | NR              | Arm 3 | Children not eligible to receive WIC benefits | Fruit Juice        | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (50.8) | NR           | NR                      | Comparator: 3 (95% CI: 39.3-62.1), p=NR                    | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 1 | WIC Participant                               | 100% juice         | 24-hour dietary recall - NDSR      | 375           | Followup timepoint: 2016 cross-sectional survey NR (34)                                 | NR           | NR                      | Comparator: 1 OR: NR (95% CI: NR), p=NR                    | NR  |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 2 | Non-WIC - Lower income                        | 100% juice         | 24-hour dietary recall - NDSR      | 169           | Followup timepoint: 2016 cross-sectional survey NR (22)                                 | NR           | NR                      | Comparator: 2 OR: 1.79 (1 vs 2) (95% CI: 1.10-2.92), p=NR  | NR  |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 3 | Non- WIC - Higher Income                      | 100% juice         | 24-hour dietary recall - NDSR      | 357           | Followup timepoint: 2016 cross-sectional survey NR (15)                                 | NR           | NR                      | Comparator: 3 OR: 2.88 (1 vs. 3) (95% CI: 1.86-4.45), p=NR | NR  |

| Author, Year                | Subgroup        | Arm   | Arm Name                 | Outcome Definition | Tool                          | N at Analysis | Followup Outcome, n(%)                                  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------|-------|--------------------------|--------------------|-------------------------------|---------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 1 | WIC Participant          | 100% juice (WIC)   | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (63) | NR           | NR                      | Comparator: 1<br>OR: NR (95% CI: NR), p=NR                      | NR               |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 2 | Non-WIC - Lower income   | 100% juice (WIC)   | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (51) | NR           | NR                      | Comparator: 2<br>OR: 1.6 (1 vs. 2) (95% CI: 1.06, 2.41 ), p=NR  | NR               |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 3 | Non- WIC - Higher Income | 100% juice (WIC)   | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (32) | NR           | NR                      | Comparator: 3<br>OR: 3.56 (1 vs. 3) (95% CI: 2.50, 5.05 ), p=NR | NR               |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 1 | WIC Participant          | 100% juice (WIC)   | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (63) | NR           | NR                      | Comparator:<br>OR: NR (95% CI: NR), p=NR                        | NR               |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 2 | Non-WIC - Lower income   | 100% juice (WIC)   | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (42) | NR           | NR                      | Comparator:<br>OR: 2.26 (1 vs. 2) (95% CI: 1.24, 4.14 ), p=NR   | NR               |

| Author, Year                | Subgroup      | Arm   | Arm Name                 | Outcome Definition | Tool                          | N at Analysis | Followup Outcome, n(%)                                  | Outcome Unit | Within-group Difference | Between-group Difference                                   | Adjusted Factors |
|-----------------------------|---------------|-------|--------------------------|--------------------|-------------------------------|---------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2018 <sup>31</sup> | child 24-47.9 | Arm 3 | Non- WIC - Higher Income | 100% juice (WIC)   | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (38) | NR           | NR                      | Comparator: OR: 2.74 (1 vs. 3) (95% CI: 1.62, 4.64 ), p=NR | NR               |

CI=confidence interval; FPL=federal poverty level; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-228. Dietary intake continuous outcomes (total red and orange vegetables) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup      | Arm   | Arm Name                     | Outcome Definition   | Tool | N at Analysis                  | Followup Outcome, n(%)                                     | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors |
|----------------------------|---------------|-------|------------------------------|--|------|--------------------------------|--|--------------|-------------------------|------------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Mean intake of total red and orange vegetables                                     | NA   | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.23 (SE 0.05) | c eq         | Not reported            | Comparator: NA<br>p=NR       | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Mean intake of total red and orange vegetables                                     | NA   | Baseline: 224<br>Followup: 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.01 (SE 0.06) | c eq         | Not reported            | Comparator: Arm 3<br>p=<0.05 | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Mean intake of total red and orange vegetables                                     | NA   | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.18 (SE 0.03) | c eq         | Not reported            | Comparator: NA<br>p=NR       | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of total red and orange vegetables | NA   | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 49.1 (SE 3.5)  | %            | Not reported            | Comparator: Arm 3<br>p=<0.05 | NR               |



| Author, Year               | Subgroup      | Arm   | Arm Name                     | Outcome Definition   | Tool | N at Analysis                  | Followup Outcome, n(%)                                    | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|----------------------------|---------------|-------|------------------------------|--|------|--------------------------------|---|--------------|-------------------------|--------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of total red and orange vegetables | NA   | Baseline: 224<br>Followup: 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 35.8 (SE 5.6) | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Percent contribution to total food group intake of total red and orange vegetables | NA   | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 34.5 (SE 3.2) | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |

c eq=equivalent concentration; CI=confidence interval; N=sample size; NA=not available; NR=not reported; p=p-value; SE=standard error; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-229. Dietary intake continuous outcomes (total starchy vegetables) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup      | Arm   | Arm Name                     | Outcome Definition   | N at Analysis                  | Followup Outcome, n(%)                                     | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors |
|----------------------------|---------------|-------|------------------------------|--|--------------------------------|--|--------------|-------------------------|------------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Mean intake of total red and orange vegetables                                     | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.12 (SE 0.05) | c eq         | Not reported            | Comparator: NA<br>p=NR       | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Mean intake of total red and orange vegetables                                     | Baseline: 224<br>Followup: 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.23 (SE 0.07) | c eq         | Not reported            | Comparator: NA<br>p=NR       | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Mean intake of total red and orange vegetables                                     | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 0.19 (SE 0.05) | c eq         | Not reported            | Comparator: NA<br>p=NR       | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of total red and orange vegetables | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 18.2 (SE 3.8)  | %            | Not reported            | Comparator: Arm 3<br>p=<0.05 | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of total red and orange vegetables | Baseline: 224<br>Followup: 224 | Baseline: NR<br>Followup: Mean 37.5 (SE 5.5)               | %            | Not reported            | Comparator: NA<br>p=NR       | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Percent contribution to total food group intake of total red and orange vegetables | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 34.4 (SE 3.5)  | %            | Not reported            | Comparator: NA<br>p=NR       | NR               |

c eq=equivalent concentration; CI=confidence interval; N=sample size; NA=not available; NR=not reported; p=p-value; SE=standard error; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-230. Dietary intake categorical outcomes (fruit juice) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Subgroup             | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|--------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (25) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.44 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (32) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.44 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (18) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.44 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (29) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.44 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (25) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (32) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (18) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)                  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--------------------|------|---------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (29) | Any          | NR                      | Comparator:<br>Arm 3<br>% : p<0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (32) | Any          | NR                      | Comparator: Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (29) | Any          | NR                      | Comparator:<br>Arm 2<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | 100% Juice         | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (54) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction:<br>p=0.04 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (60) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction:<br>p=0.04 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | 100% Juice         | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (39) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction:<br>p=0.04 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (60) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction:<br>p=0.04 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | 100% Juice         | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (54) | Any          | NR                      | Comparator: Ref  | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (60) | Any          | NR                      | Comparator: Arm 1<br>% : $p \geq 0.05$                                    | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (39) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (60) | Any          | NR                      | Comparator: Arm 3<br>% : $p < 0.05$                                       | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (60) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (60) | Any          | NR                      | Comparator: Arm 2<br>% : $p \geq 0.05$                                    | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (55) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.21$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (68) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.21$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (39) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p=0.21$ | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (63) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.21 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (55) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (68) | Any          | NR                      | Comparator: Arm 1<br>% : p<0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (39) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (63) | Any          | NR                      | Comparator: Arm 3<br>% : p<0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (68) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | 100% Juice         | NR   | NR            | Followup timepoint: NR<br>NR (63) | Any          | NR                      | Comparator: Arm 2<br>% : p≥0.05   | % FPL            |

CI=confidence interval; FPL=federal poverty level; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-231. Dietary intake categorical outcomes (fruits) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup | Arm   | Arm Name   | Outcome Definition | Tool                               | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference                        | Adjusted Factors  |
|----------------------------|----------|-------|--|--------------------|------------------------------------|---------------|--|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR       | Arm 1 | Children currently receiving WIC benefits                    | Total Fruit        | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey<br>NR (70.6) | NR                      | Comparison: 1<br>(95% CI: 63.9-76.4),<br>p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR       | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Total Fruit        | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey<br>NR (57.6) | NR                      | Comparison: 2<br>(95% CI: 41.7-72.0),<br>p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR       | Arm 3 | Children not eligible to receive WIC benefits                | Total Fruit        | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey<br>NR (86.4) | NR                      | Comparison: 3<br>(95% CI: 78.5-91.7),<br>p=NR   | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

CI=confidence interval; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-232. Dietary intake categorical outcomes (fruits) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Subgroup             | Arm   | Arm Name     | Outcome Definition                     | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|--|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (77) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.65 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (72) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.65 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (76) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.65 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (74) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.65 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (77) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (72) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (76) | Any          | NR                      | Comparator: Ref   | % FPL            |



| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition                     | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (74) | Any          | NR                      | Comparator: Arm 3<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (72) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (74) | Any          | NR                      | Comparator: Arm 2<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (81) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.67 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (67) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.67 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (85) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.67 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (75) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.67 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR<br>NR (81) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition                     | Tool | N at Analysis | Followup Outcome, n(%)         | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|---------------|--------------------------------|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR NR (67) | Any          | NR                      | Comparator: Arm 1 % : p<0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR NR (85) | Any          | NR                      | Comparator: Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR NR (75) | Any          | NR                      | Comparator: Arm 3 % : p<0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR NR (67) | Any          | NR                      | Comparator: Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR NR (75) | Any          | NR                      | Comparator: Arm 2 % : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR NR (75) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: p=0.79 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR NR (69) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: p=0.79 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup timepoint: NR NR (82) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: p=0.79 | % FPL            |

| Author, Year                | Subgroup              | Arm   | Arm Name     | Outcome Definition                     | Tool | N at Analysis | Followup Outcome, n(%)                          | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|---------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (76)         | Any          | NR                      | Comparator:<br>Not applicable<br>P-Value of WIC<br>x Time<br>interaction:<br>p=0.79 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (75)         | Any          | NR                      | Comparator:<br>Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (69)         | Any          | NR                      | Comparator:<br>Arm 1<br>% : p≥0.05  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (82)         | Any          | NR                      | Comparator:<br>Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (76)         | Any          | NR                      | Comparator:<br>Arm 3<br>% : p≥0.05  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (69)         | Any          | NR                      | Comparator:<br>Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any kind of fruit, excludes 100% juice | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (76)         | Any          | NR                      | Comparator:<br>Arm 2<br>% : p≥0.05  | % FPL            |
| Ishdorj, 2013 <sup>66</sup> | NR                    | Arm 1 | Pre-2009     | Four or more times per day             | NA   | 766           | Followup<br>timepoint:<br>Baseline<br>NR (7)    | NA           | NR                      | Comparator: NR  | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR                    | Arm 2 | Post-2009    | Four or more times per day             | NA   | 876           | Followup<br>timepoint:<br>Baseline<br>NR (11.5) | NA           | NR                      | Comparator: NR  | NR               |

| Author, Year                | Subgroup | Arm   | Arm Name  | Outcome Definition        | Tool | N at Analysis | Followup Outcome, n(%)                 | Outcome Unit | Within-group Difference | Between-group Difference                                      | Adjusted Factors |
|-----------------------------|----------|-------|-----------|---------------------------|------|---------------|--|--------------|-------------------------|---|------------------|
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 1 | Pre-2009  | Three times per day       | NA   | 766           | Followup timepoint: Baseline NR (14.4) | NA           | NR                      | Comparator: NR  | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 2 | Post-2009 | Three times per day       | NA   | 876           | Followup timepoint: Baseline NR (15.2) | NA           | NR                      | Comparator: NR  | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 1 | Pre-2009  | Two or more times per day | NA   | 766           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: Ref   | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 2 | Post-2009 | Two or more times per day | NA   | 876           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: 2 vs. 1<br>Mean difference from baseline: 2, p=NR | NR               |

CI=confidence interval; n=sample size; NA=not available; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation;  
 USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-233. Dietary intake categorical outcomes (whole fruit) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup        | Arm   | Arm Name                 | Outcome Definition   | Tool                          | N at Analysis | Followup Outcome, n(%)                                  | Within-group Difference | Between-group Difference  |
|-----------------------------|-----------------|-------|--------------------------|----------------------|-------------------------------|---------------|---|-------------------------|---|
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 1 | WIC Participant          | Any fruit (WIC food) | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (69) | NR                      | Comparator: 1<br>OR: NR (95% CI: NR), p=NR                      |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 2 | Non-WIC - Lower income   | Any fruit (WIC food) | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (80) | NR                      | Comparator: 2<br>OR: 0.55 (1 vs. 2) (95% CI: 0.34, 0.88 ), p=NR |
| Guthrie, 2018 <sup>31</sup> | child 12-23.9mo | Arm 3 | Non- WIC - Higher Income | Any fruit (WIC food) | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (87) | NR                      | Comparator: 3<br>OR: 0.33 (1 vs. 3) (95% CI: 0.21, 0.50 ), p=NR |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 1 | WIC Participant          | Any fruit (WIC food) | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (70) | NR                      | Comparator:<br>OR: NR (95% CI: NR), p=NR                        |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 2 | Non-WIC - Lower income   | Any fruit (WIC food) | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (76) | NR                      | Comparator:<br>OR: 0.73 (1 vs. 2) (95% CI: 0.38, 1.40 ), p=NR   |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 3 | Non- WIC - Higher Income | Any fruit (WIC food) | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (84) | NR                      | Comparator:<br>OR: 0.43 (1 vs. 3) (95% CI: 0.23, 0.79 ), p=NR   |

CI=confidence interval; n=sample size; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-234. Dietary intake continuous outcomes (fruit juice) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                  | Sub-group | Arm   | Arm Name         | Outcome Definition                              | Tool                       | N                              | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|-------------------------------|-----------|-------|------------------|---|----------------------------|--------------------------------|--|-----------------|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup>       | NR        | Arm 1 | WIC              | 100% fruit juice component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Follow up: NR | Baseline: Mean 3 (SE 0.2)<br>Followup: NR  | NR              | NR                      | Comparator : Arm 2 & 3<br>p<0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup>       | NR        | Arm 2 | WIC-Eligible     | 100% fruit juice component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Follow up: NR | Baseline: Mean 3.4 (SE 0.2)<br>Followup: NR  | NR              | NR                      | Comparator : Arm 1 & 3<br>p<0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Kay, 2021 <sup>35</sup>       | NR        | Arm 3 | Non-WIC          | 100% fruit juice component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Follow up: NR | Baseline: Mean 3.8 (SE 0.2)<br>Followup: NR  | NR              | NR                      | Comparator : Arm 1 & 2<br>p<0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings |
| Vercammen, 2018 <sup>47</sup> | NR        | Arm 1 | WIC Participants | Fruit Juice                                     | NR                         | Baseline: 677<br>Follow up: NR | Followup timepoint: NR<br>Baseline: Mean 0.77 (95% CI: 0.60 to 0.94)<br>Followup: NR | cup-equivalents | NR                      | Comparator :<br>p<0.05           | same as above   |

| Author, Year                  | Sub-group | Arm   | Arm Name                        | Outcome Definition | Tool | N                              | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|-----------|-------|---------------------------------|--------------------|------|--------------------------------|--|-----------------|-------------------------|--------------------------|------------------|
| Vercammen, 2018 <sup>47</sup> | NR        | Arm 2 | Income-eligible nonparticipants | Fruit Juice        | NR   | Baseline: 409<br>Follow up: NR | Followup timepoint: NR<br>Baseline: Mean 0.55 (95% CI: 0.44 to 0.67)<br>Followup: NR | cup-equivalents | NR                      | Comparator : NR          | same as above    |
| Vercammen, 2018 <sup>47</sup> | NR        | Arm 3 | Higher Income nonparticipants   | Fruit Juice        | NR   | Baseline: 490<br>Follow up: NR | Followup timepoint: NR<br>Baseline: Mean 0.59 (95% CI: 0.41 to 0.77)<br>Followup: NR | cup-equivalents | NR                      | Comparator : NR          | same as above    |

BMI=body mass index; BMR= basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; Fl oz=fluid ounce; n=sample size; f/u=followup; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-235. Dietary intake continuous outcomes (fruit juice) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group | Arm   | Arm Name    | Outcome Definition          | Tool  | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-----------------------------|-----------|-------|-------------|-----------------------------|---|-------------------------------|---|--------------|-------------------------|---|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 1 | Fall 2008   | fruit juice in cups per day | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.75 cups (SE 0.07)<br>Followup: NR | cups/ day    | NR                      | Comparator: Ref   | Time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level. |
| Morshed, 2015 <sup>71</sup> | NR        | Arm 2 | Spring 2010 | fruit juice in cups per day | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.61 cups (SE 0.06)<br>Followup: NR | cups/ day    | NR                      | Comparator: 1 vs. 2<br>means ratio: 0.92 (95% CI: 0.82 to 1.03), p>0.05 | Time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level. |



| Author, Year                    | Sub-group         | Arm     | Arm Name         | Outcome Definition                       | Tool                 | N                              | Followup Outcome   | Outcome Unit                    | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|---------------------------------|-------------------|---------|------------------|--|----------------------|--------------------------------|--|---------------------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup>        | Children          | Arm 1   | Hispanic         | Fruit juice intake (1 serving = 4 fl oz) | 24-hour recall, NDSR | Baseline: 112<br>Followup: 89  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.7 (SD NR)<br>Followup: Mean 0.66 (SD NR)  | % > 0 servings / day            | % change from baseline: p>0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup>        | Children          | Arm 2   | African American | Fruit juice intake (1 serving = 4 fl oz) | 24-hour recall, NDSR | Baseline: 97<br>Followup: 64   | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.64 (SD NR)<br>Followup: Mean 0.65 (SD NR)                                       | % > 0 servings / day            | % change from baseline: p>0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children | Overall | Overall          | 100% fruit juice, servings/day           | 24 hour recall (NDS) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 1 (SD 1.2)<br>Followup: Mean 0.8 (SD 1.1) | serving/day (1 serving is 4 oz) | Mean change from baseline      | Comparator: NR           | NR  |

| Author, Year                    | Sub-group                 | Arm     | Arm Name | Outcome Definition             | Tool                 | N                            | Followup Outcome  | Outcome Unit                    | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|--------------------------------|----------------------|------------------------------|---|---------------------------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | 100% fruit juice, servings/day | 24 hour recall (NDS) | Baseline: 90<br>Followup: 90 | Followup timepoint: yes - follow-up assessment at 6 months post WIC food package change<br>Baseline: Mean 1.1 (SD 1.7)<br>Followup: Mean 1 (SD 1.4) | serving/day (1 serving is 4 oz) | Mean change from baseline | Comparator: NR           | NR               |

BMI=body mass index; BMR= basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; Fl oz=fluid ounce; n=sample size; f/u=followup; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-236. Dietary intake continuous outcomes (total fruit) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                  | Subgroup | Arm   | Arm Name                        | Outcome Definition | Tool | N                             | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference | Adjusted Factors |
|-------------------------------|----------|-------|---------------------------------|--------------------|------|-------------------------------|--|-----------------|-------------------------|--------------------------|------------------|
| Vercammen, 2018 <sup>47</sup> | NR       | Arm 1 | WIC Participants                | Total Fruit        | NR   | Baseline: 677<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean 1.52 (95% CI: 1.26 to 1.77)<br>Followup: NR | cup-equivalents | NR                      | Comparator: p<0.05       | same as above    |
| Vercammen, 2018 <sup>47</sup> | NR       | Arm 2 | Income-eligible nonparticipants | Total Fruit        | NR   | Baseline: 409<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean 1.22 (95% CI: 1.03 to 1.41)<br>Followup: NR | cup-equivalents | NR                      | Comparator: NR           | same as above    |
| Vercammen, 2018 <sup>47</sup> | NR       | Arm 3 | Higher Income nonparticipants   | Total Fruit        | NR   | Baseline: 490<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean 1.32 (95% CI: 1.07 to 1.58)<br>Followup: NR | cup-equivalents | NR                      | Comparator: NR           | same as above    |

| Author, Year               | Subgroup | Arm   | Arm Name             | Outcome Definition | Tool | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|----------|-------|----------------------|--------------------|------|---|--|--------------|-------------------------|---|---|
| Tester, 2016 <sup>45</sup> | NR       | Arm 1 | Non-WIC Participants | Total fruit        | NR   | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 3.2 (SD NR)<br>Followup: Mean 3.6 (SD NR) | NR           | NR                      | Comparator: Ref   | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |
| Tester, 2016 <sup>45</sup> | NR       | Arm 2 | WIC Participants     | Total fruit        | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 3.7 (SD NR)<br>Followup: Mean 3.8 (SD NR) | NR           | NR                      | Comparator: Arm1<br>Ratio of Relative Changes: 1 (95% CI: 0.8 to 1.2), p=0.73 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

BMI=body mass index; BMR= basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; Fl oz=fluid ounce; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-237. Dietary intake continuous outcomes (total fruit) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup                  | Arm     | Arm Name | Outcome Definition   | Tool                 | N                               | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|--|----------------------|---------------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children         | Overall | Overall  | NDS fruit food groups, excluding juices, avocado, fried fruits, and fruit-based savory snacks. One serving is 1 medium piece of fruit, 1/4 cup dried fruit, 1/2 cup fresh, frozen, canned, or cooked fruit (chopped or default form), or 1/2 fresh grapefruit. | 24 hour recall (NDS) | Baseline: 121<br>Follow up: 121 | Followup timepoint: yes<br>- follow-up assessment 6 months post WIC food package change<br>Baseline:<br>Mean 1 (SD 1.5)<br>Followup:<br>Mean 1.1 (SD 1.1)    | servings/day | Mean change from baseline | Comparator: NR           | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | NDS fruit food groups, excluding juices, avocado, fried fruits, and fruit-based savory snacks. One serving is 1 medium piece of fruit, 1/4 cup dried fruit, 1/2 cup fresh, frozen, canned, or cooked fruit (chopped or default form), or 1/2 fresh grapefruit. | 24 hour recall (NDS) | Baseline: 90<br>Follow up: 90   | Followup timepoint: yes<br>- follow-up assessment 6 months post WIC food package change<br>Baseline:<br>Mean 0.4 (SD 0.09)<br>Followup:<br>Mean 0.5 (SD 1.4) | servings/day | Mean change from baseline | Comparator: NR           | NR               |

| Author, Year                 | Subgroup | Arm   | Arm Name  | Outcome Definition                            | Tool  | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|------------------------------|----------|-------|-----------|---|---|--------------------------------|---|--------------|-------------------------|--------------------------|---|
| Morshe d, 2015 <sup>71</sup> | NR       | Arm 1 | Fall 2008 | fruit in cups per day (excluding fruit juice) | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Follow up: NR | Followup timepoint: NR<br>Baseline: Mean: 1.79 cups (SE 0.07)<br>Followup: NR | cups/ day    | NR                      | Comparator: Ref          | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                 | Subgroup | Arm   | Arm Name    | Outcome Definition                            | Tool  | N                              | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|------------------------------|----------|-------|-------------|---|---|--------------------------------|---|--------------|-------------------------|---|---|
| Morshe d, 2015 <sup>71</sup> | NR       | Arm 2 | Spring 2010 | fruit in cups per day (excluding fruit juice) | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Follow up: NR | Followup timepoint: NR<br>Baseline: Mean: 1.79 cups (SE 0.07)<br>Followup: NR | cups/ day    | NR                      | Comparator: 1 vs. 2<br>means ratio: 1 (95% CI: 0.89 to 1.13),<br>p>0.05 | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |



| Author, Year             | Subgroup | Arm   | Arm Name         | Outcome Definition   | Tool                 | N                              | Followup Outcome   | Outcome Unit         | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|--------------------------|----------|-------|------------------|--|----------------------|--------------------------------|--|----------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Children | Arm 1 | Hispanic         | Fruit intake (includes 1 medium piece of fruit, 1/4 c dried fruit, 1/2 c fresh, frozen, canned fruit, or 1/2 fresh grapefruit; excludes juices, avocado, and fried fruits) | 24-hour recall, NDSR | Baseline: 112<br>Follow up: 89 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.57 (SD NR)<br>Followup: Mean 0.63 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Children | Arm 2 | African American | Fruit intake (includes 1 medium piece of fruit, 1/4 c dried fruit, 1/2 c fresh, frozen, canned fruit, or 1/2 fresh grapefruit; excludes juices, avocado, and fried fruits) | 24-hour recall, NDSR | Baseline: 97<br>Follow up: 64  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.27 (SD NR)<br>Followup: Mean 0.37 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |

BMI=body mass index; BMR= basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; Fl oz=fluid ounce; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; SNAP=Supplemental Nutrition Assistance Program; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-238. Dietary intake continuous outcomes (whole fruit) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                  | Sub-group | Arm   | Arm Name         | Outcome Definition                         | Tool                       | N                             | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference        | Adjusted Factors  |
|-------------------------------|-----------|-------|------------------|--|----------------------------|-------------------------------|--|-----------------|-------------------------|---------------------------------|---|
| Kay, 2021 <sup>35</sup>       | NR        | Arm 1 | WIC              | Whole fruit component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR | Baseline: Mean 5.6 (SE 0.3)<br>Followup: NR  | NR              | NR                      | Comparator: Arm 2 & 3<br>p<0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>       | NR        | Arm 2 | WIC-Eligible     | Whole fruit component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR | Baseline: Mean 6.8 (SE 0.4)<br>Followup: NR  | NR              | NR                      | Comparator: Arm 1 & 3<br>p<0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>       | NR        | Arm 3 | Non-WIC          | Whole fruit component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR | Baseline: Mean 6.7 (SE 0.3)<br>Followup: NR  | NR              | NR                      | Comparator: Arm 1 & 2<br>p<0.05 | Ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Vercammen, 2018 <sup>47</sup> | NR        | Arm 1 | WIC Participants | Whole Fruit                                | NR                         | Baseline: 677<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean 0.75 (95% CI: 0.58 to 0.91)<br>Followup: NR | cup-equivalents | NR                      | Comparator: NR                  | child characteristics (gender, age, race/ethnicity, overweight/obesity) and parent/caregiver characteristics (education, marital status, SNAP participation, and income-to-poverty ratio) |

| Author, Year                  | Sub-group | Arm   | Arm Name                        | Outcome Definition | Tool | N   | Followup Outcome   | Outcome Unit    | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-------------------------------|-----------|-------|---------------------------------|--------------------|------|---|--|-----------------|-------------------------|--------------------------|---|
| Vercammen, 2018 <sup>47</sup> | NR        | Arm 2 | Income-eligible nonparticipants | Whole Fruit        | NR   | Baseline: 409<br>Followup: NR   | Followup timepoint: NR<br>Baseline: Mean 0.66 (95% CI: 0.52 to 0.81)<br>Followup: NR                                       | cup-equivalents | NR                      | Comparator: NR           | same as above   |
| Vercammen, 2018 <sup>47</sup> | NR        | Arm 3 | Higher Income nonparticipants   | Whole Fruit        | NR   | Baseline: 490<br>Followup: NR   | Followup timepoint: NR<br>Baseline: Mean 0.73 (95% CI: 0.56 to 0.91)<br>Followup: NR                                       | cup-equivalents | NR                      | Comparator: NR           | same as above   |
| Tester, 2016 <sup>45</sup>    | NR        | Arm 1 | Non-WIC Participants            | Whole fruit        | NR   | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 2.5 (SD NR)<br>Followup: Mean 2.8 (SD NR) | NR              | NR                      | Comparator: Ref          | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year               | Sub-group | Arm   | Arm Name         | Outcome Definition | Tool | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|-----------|-------|------------------|--------------------|------|---|--|--------------|-------------------------|--|---|
| Tester, 2016 <sup>45</sup> | NR        | Arm 2 | WIC Participants | Whole fruit        | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 2.8 (SD NR)<br>Followup: Mean 3.2 (SD NR) | NR           | NR                      | Comparator: Arm1<br>Ratio of Relative Changes: 1.1 (95% CI: 0.8 to 1.4),<br>p=0.62 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

BMI=body mass index; CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-239. Dietary intake categorical outcomes (reduced fat milk) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Sub-group     | Arm   | Arm Name                                  | Outcome Definition                  | Tool                               | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference                                   | Adjusted Factors   |
|-----------------------------|---------------|-------|---|-------------------------------------|------------------------------------|---------------|---|-------------------------|--|--|
| Guthrie, 2018 <sup>31</sup> | child 24-47.9 | Arm 1 | WIC Participant                           | Low-fat or non-fat milk             | 24-hour dietary recall - NDSR      | 375           | Followup timepoint: 2016 cross-sectional survey NR (45)                               | NR                      | Comparator: OR: NR (95% CI: NR), p=NR                      | NR   |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9 | Arm 2 | Non-WIC - Lower income                    | Low-fat or non-fat milk             | 24-hour dietary recall - NDSR      | 169           | Followup timepoint: 2016 cross-sectional survey NR (13)                               | NR                      | Comparator: OR: 5.36 (1 vs. 2) (95% CI: 2.40, 12.0 ), p=NR | NR   |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9 | Arm 3 | Non- WIC - Higher Income                  | Low-fat or non-fat milk             | 24-hour dietary recall - NDSR      | 357           | Followup timepoint: 2016 cross-sectional survey NR (22)                               | NR                      | Comparator: OR: 2.92 (1 vs. 3) (95% CI: 1.76, 4.85 ), p=NR | NR   |
| Hamner, 2019 <sup>32</sup>  | NR            | Arm 1 | Children currently receiving WIC benefits | Non-whole milk (2%, 1%, or non-fat) | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (20) | NR                      | Comparator: 1 (95% CI: 13.6-28.4), p=NR                    | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling , nonresponse, noncoverage, and day of the week.18 All percentages that are presented are weighted. |

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition                  | Tool                               | N at Analysis | Followup Outcome, n(%)  | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|--|-------------------------------------|------------------------------------|---------------|---|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Non-whole milk (2%, 1%, or non-fat) | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (23.9) | NR                      | Comparator: 2 (95% CI: 13.9-38.0), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits                | Non-whole milk (2%, 1%, or non-fat) | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (22.4) | NR                      | Comparator: 3 (95% CI: 12.9-35.9), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

CI=confidence interval; FFQ=Food Frequency Questionnaire; FPL=federal poverty level; ITO=Indian Tribal Organizations; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-240. Dietary intake categorical outcomes (reduced fat milk) of studies investigating the Key Question 2 association between infant and child outcomes and W the 2009 food package**

| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition                                       | Tool | N at Analysis | Followup Outcome, n(%)                 | Outcome Unit | Within-group Difference | Between-group Difference                         | Adjusted Factors  |
|-----------------------------|-----------|-------|-----------|--|------|---------------|--|--------------|-------------------------|--|---|
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | Proportion - drinks reduced-fat milk most often          | NA   | 766           | Followup timepoint: Baseline NR (53.5) | NA           | NR                      | Comparator: 2 vs. 1 - Reduced vs. low-fat p=NS   | Child sex, child age, caregiver's education, caregiver's age, ethnicity, recruitment site (ITO vs. state), region |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | Proportion - drinks reduced-fat milk most often          | NA   | 876           | Followup timepoint: Baseline NR (67.5) | NA           | NR                      | Comparator: 2 vs. 1 - Reduced vs. low-fat p<0.01 | NR  |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | Proportion - drinks low-fat (1% or skim) milk most often | NA   | 766           | Followup timepoint: Baseline NR (12.1) | NA           | NR                      | Comparator: 2 vs. 1 - Whole vs. low-fat p<0.01   | Child sex, child age, caregiver's education, caregiver's age, ethnicity, recruitment site (ITO vs. state), region |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | Proportion - drinks low-fat (1% or skim) milk most often | NA   | 876           | Followup timepoint: Baseline NR (16.3) | NA           | NR                      | Comparator: 2 vs. 1 - Whole vs. low-fat p<0.01   | NR  |



| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|-----------|--|---|---------------|---|--------------|-------------------------|--------------------------|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 1 | Fall 2008 | not clearly stated, methods describe "prevalence of intake of lower-fat milk" and results describe "proportion consuming low fat milk" | modified Block Kids 2004 Hispanic FFQ, weekly version | 161           | Followup timepoint: Fall 2008<br>NR (reported as proportion = 0.60 (SE 0.05)) | NR           | Not reported            | Comparator: Ref          | From the Methods "The generalized estimating equation method was used to compare changes in the type of milk consumed by the child, a dichotomous variable, over time. The model was adjusted for repeated measures among participants, a random variable, and the effect of Head Start center, a fixed variable. None of the other aforementioned covariates improved the model, and thus, they were omitted from the final analysis." |

| Author, Year                | Sub-group | Arm   | Arm Name    | Outcome Definition   | Tool  | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                                    | Adjusted Factors  |
|-----------------------------|-----------|-------|-------------|--|---|---------------|---|--------------|-------------------------|---|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 2 | Spring 2010 | not clearly stated, methods describe "prevalence of intake of lower-fat milk" and results describe "proportion consuming low fat milk" | modified Block Kids 2004 Hispanic FFQ, weekly version | 161           | Followup timepoint: Spring 2010<br>NR (reported as proportion = 0.81 (SE 0.05)) | NR           | Not reported            | Comparator: 1 vs. 2<br>OR: 2.94 (95% CI: 1.37-6.25), p<0.01 | From the Methods "The generalized estimating equation method was used to compare changes in the type of milk consumed by the child, a dichotomous variable, over time. The model was adjusted for repeated measures among participants, a random variable, and the effect of Head Start center, a fixed variable. None of the other aforementioned covariates improved the model, and thus, they were omitted from the final analysis." |

| Author, Year                | Sub-group | Arm   | Arm Name | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)             | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|----------|---|------|---------------|------------------------------------|--------------|-------------------------|--------------------------|---|
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 1 | Child    | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk oldest child who receives WIC usually drank over the last week) - Yes/no | NA   | 46            | Followup timepoint: Baseline<br>NA | NA           | NR                      | Comparator: NA           | mother's education, mother's type of milk consumption, type of milk family would have consumed if using own money instead of WIC, |
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 1 | Child    | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk oldest child who receives WIC usually drank over the last week) - Yes/no | NA   | 34            | Followup timepoint: Week 1<br>NA   | NA           | NR                      | Comparator: NA           | mother's education, mother's type of milk consumption, type of milk family would have consumed if using own money instead of WIC, |

| Author, Year                | Sub-group | Arm   | Arm Name | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                 | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|----------|---|------|---------------|--|--------------|-------------------------|--------------------------|---|
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 1 | Child    | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk oldest child who receives WIC usually drank over the last week) - Yes/no | NA   | 39            | Followup timepoint: Week 4<br>NA       | NA           | NR                      | Comparator: NA           | mother's education, mother's type of milk consumption, type of milk family would have consumed if using own money instead of WIC, |
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 1 | Child    | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk oldest child who receives WIC usually drank over the last week) - Yes/no | NA   | 46            | Followup timepoint: Baseline 19 (41.3) | NA           | % change from baseline  | Comparator: NA           | NR  |

| Author, Year                | Sub-group | Arm   | Arm Name | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)                  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|----------|---|------|---------------|---|--------------|-------------------------|--------------------------|---|
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 1 | Child    | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk oldest child who receives WIC usually drank over the last week) - Yes/no | NA   | 34            | Followup timepoint: Week 1<br>20 (58.5) | NA           | % change from baseline  | Comparator: NA           | NR  |
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 1 | Child    | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk oldest child who receives WIC usually drank over the last week) - Yes/no | NA   | 39            | Followup timepoint: Week 4<br>31 (79.5) | NA           | % change from baseline  | Comparator: NA           | NR  |
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 2 | Mother   | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk mother usually drank over the last week) - Yes/no                        | NA   | 38            | Followup timepoint: Baseline<br>NA      | NA           | NR                      | Comparator: NA           | mother's education, mother's type of milk consumption, type of milk family would have consumed if using own money instead of WIC, |

| Author, Year                | Sub-group | Arm   | Arm Name | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)                 | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|----------|--|------|---------------|--|--------------|-------------------------|--------------------------|---|
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 2 | Mother   | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk mother usually drank over the last week) - Yes/no | NA   | 30            | Followup timepoint: Week 1<br>NA       | NA           | NR                      | Comparator: NA           | mother's education, mother's type of milk consumption, type of milk family would have consumed if using own money instead of WIC, |
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 2 | Mother   | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk mother usually drank over the last week) - Yes/no | NA   | 32            | Followup timepoint: Week 4<br>NA       | NA           | NR                      | Comparator: NA           | mother's education, mother's type of milk consumption, type of milk family would have consumed if using own money instead of WIC, |
| Meiqari, 2015 <sup>70</sup> | NR        | Arm 2 | Mother   | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk mother usually drank over the last week) - Yes/no | NA   | 38            | Followup timepoint: Baseline 16 (42.1) | NA           | % change from baseline  | Comparator: NA           | NR  |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition   | Tool | N at Analysis | Followup Outcome, n(%)               | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--|------|---------------|--------------------------------------|--------------|-------------------------|---|------------------|
| Meiqari, 2015 <sup>70</sup> | NR                    | Arm 2 | Mother       | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk mother usually drank over the last week) - Yes/no | NA   | 30            | Followup timepoint: Week 1 19 (63.3) | NA           | % change from baseline  | Comparator: NA  | NR               |
| Meiqari, 2015 <sup>70</sup> | NR                    | Arm 2 | Mother       | Usually consumed skim, 1% or 2% reduced fat milk (question was what kind of milk mother usually drank over the last week) - Yes/no | NA   | 32            | Followup timepoint: Week 4 23 (71.9) | NA           | % change from baseline  | Comparator: NA  | NR               |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Reduced, low or non-fat milk   | NR   | NR            | Followup timepoint: NR NR (24)       | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.005$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Reduced, low or non-fat milk   | NR   | NR            | Followup timepoint: NR NR (30)       | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.005$ | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|------------------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (24) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.005$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (13) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.005$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (24) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (30) | Any          | NR                      | Comparator: Arm 1<br>% : $p \geq 0.05$  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (24) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (13) | Any          | NR                      | Comparator: Arm 3<br>% : $p < 0.05$   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (30) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (13) | Any          | NR                      | Comparator: Arm 2<br>% : $p < 0.05$   | % FPL            |



| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|------------------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (39) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.005$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (46) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.005$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (41) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.005$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (18) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p \leq 0.005$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (39) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (46) | Any          | NR                      | Comparator: Arm 1<br>% : $p \geq 0.05$  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (41) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Reduced, low or non-fat milk | NR   | NR            | Followup timepoint: NR<br>NR (18) | Any          | NR                      | Comparator: Arm 3<br>% : $p < 0.05$   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name         | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference        | Adjusted Factors  |
|-----------------------------|-----------------------|-------|------------------|---|------|---------------|--|--------------|-------------------------|---------------------------------|---|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC         | Reduced, low or non-fat milk              | NR   | NR            | Followup timepoint: NR<br>NR (46)                              | Any          | NR                      | Comparator: Ref                 | % FPL   |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC         | Reduced, low or non-fat milk              | NR   | NR            | Followup timepoint: NR<br>NR (18)                              | Any          | NR                      | Comparator: Arm 2<br>% : p<0.05 | % FPL   |
| Whaley, 2012 <sup>21</sup>  | NR                    | Arm 1 | Pre-revision WIC | Usually consumed by child: lower fat milk | NR   | 3004          | Followup timepoint: July 2009 before WIC revision<br>NR (66.8) | NR           | NR                      | Comparator: Ref                 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Sub-group | Arm   | Arm Name          | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference    | Adjusted Factors  |
|----------------------------|-----------|-------|-------------------|---|------|---------------|--|--------------|-------------------------|-----------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 2 | Post-revision WIC | Usually consumed by child: lower fat milk | NR   | 2996          | Followup timepoint: January 2010 after WIC revision<br>NR (86.3) | NR           | NR                      | Comparator: Arm1<br>p<0.001 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Sub-group | Arm   | Arm Name         | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)                                      | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|------------------|---|------|---------------|---|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 1 | Pre-revision WIC | Usually consumed by child: lower fat milk | NR   | 3004          | Followup timepoint: July 2009 before WIC revision NR (66.8) | NR           | NR                      | Comparator: Ref          | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Sub-group | Arm   | Arm Name          | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|-------------------|---|------|---------------|---|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 2 | Post-revision WIC | Usually consumed by child: lower fat milk | NR   | 2996          | Followup timepoint: January 2010 after WIC revision NR (86.3) | NR           | NR                      | Comparator: Arm1 p<0.001 | Breastfeeding (currently yes, no); duration household has been on WIC (y); language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year (yes, no). Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

CI=confidence interval; FFQ=Food Frequency Questionnaire; FPL=federal poverty level; ITO=Indian Tribal Organizations; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-241. Dietary intake categorical outcomes (whole milk) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|--|--------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Whole milk         | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (65)   | NR           | NR                      | Comparator: 1 (95% CI: 57.2-72.0), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Whole milk         | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (63.5) | NR           | NR                      | Comparator: 2 (95% CI: 48.0-76.7), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

| Author, Year                | Sub-group       | Arm   | Arm Name                                      | Outcome Definition    | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                                    | Adjusted Factors  |
|-----------------------------|-----------------|-------|---|-----------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup>  | NR              | Arm 3 | Children not eligible to receive WIC benefits | Whole milk            | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (66.3) | NR           | NR                      | Comparator: 3 (95% CI: 54.9-76.1), p=NR                     | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 1 | WIC Participant                               | Whole milk (WIC Food) | 24-hour dietary recall - NDSR      | 375           | Followup timepoint: 2016 cross-sectional survey NR (72)                                 | NR           | NR                      | Comparator: 1 OR: NR (95% CI: NR), p=NR                     | NR  |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 2 | Non-WIC - Lower income                        | Whole milk (WIC Food) | 24-hour dietary recall - NDSR      | 169           | Followup timepoint: 2016 cross-sectional survey NR (59)                                 | NR           | NR                      | Comparator: 2 OR: 1.73 (1 vs. 2) (95% CI: 1.14, 2.65), p=NR | NR  |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 3 | Non-WIC - Higher Income                       | Whole milk (WIC Food) | 24-hour dietary recall - NDSR      | 357           | Followup timepoint: 2016 cross-sectional survey NR (64)                                 | NR           | NR                      | Comparator: 3 OR: 1.43 (1 vs.3) (95% CI: 1.00, 2.03 ), p=NR | NR  |

CI=confidence interval; FPL=federal poverty level; ITO=Indian Tribal Organizations; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-242. Dietary intake categorical outcomes (whole milk) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Sub-group | Arm   | Arm Name         | Outcome Definition                    | Tool | N at Analysis | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|------------------|---------------------------------------|------|---------------|--|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 1 | Pre-revision WIC | Usually consumed by child: whole milk | NR   | 3004          | Followup timepoint: July 2009 before WIC revision<br>NR (31.3) | NR           | NR                      | Comparator: Ref          | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |



| Author, Year               | Sub-group | Arm   | Arm Name          | Outcome Definition                    | Tool | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|-------------------|---------------------------------------|------|---------------|---|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 2 | Post-revision WIC | Usually consumed by child: whole milk | NR   | 2996          | Followup timepoint: January 2010 after WIC revision NR (11.6) | NR           | NR                      | Comparator: Arm1 p<0.001 | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Sub-group | Arm   | Arm Name         | Outcome Definition                    | Tool | N at Analysis | Followup Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|------------------|---------------------------------------|------|---------------|--|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 1 | Pre-revision WIC | Usually consumed by child: whole milk | NR   | 3004          | Followup timepoint: July 2009 before WIC revision<br>NR (31.3) | NR           | NR                      | Comparator: Ref          | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year                | Sub-group             | Arm   | Arm Name          | Outcome Definition                    | Tool | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|-----------------------------|-----------------------|-------|-------------------|---------------------------------------|------|---------------|---|--------------|-------------------------|--|---|
| Whaley, 2012 <sup>21</sup>  | NR                    | Arm 2 | Post-revision WIC | Usually consumed by child: whole milk | NR   | 2996          | Followup timepoint: January 2010 after WIC revision NR (11.6) | NR           | NR                      | Comparator: Arm1 p<0.001   | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC      | Whole milk                            | NR   | NR            | Followup timepoint: NR NR (61)                                | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: p=0.05 | % FPL   |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC          | Whole milk                            | NR   | NR            | Followup timepoint: NR NR (59)                                | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: p=0.05 | % FPL   |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (62) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.05 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.05 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (61) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (59) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (62) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Arm 3<br>% : p<0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (59) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (73) | Any          | NR                      | Comparator: Arm 2<br>% : p<0.05   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (31) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.23 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (28) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.23 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (29) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.23 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (18) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.23 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (31) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (28) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (29) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Whole milk         | NR   | NR            | Followup timepoint: NR<br>NR (18) | Any          | NR                      | Comparator: Arm 3<br>% : p<0.05   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name  | Outcome Definition                        | Tool | N at Analysis | Followup Outcome, n(%)                    | Outcome Unit | Within-group Difference | Between-group Difference                            | Adjusted Factors  |
|-----------------------------|-----------------------|-------|-----------|---|------|---------------|---|--------------|-------------------------|---|---|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC  | Whole milk                                | NR   | NR            | Followup timepoint: NR<br>NR (28)         | Any          | NR                      | Comparator: Ref                                     | % FPL   |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC  | Whole milk                                | NR   | NR            | Followup timepoint: NR<br>NR (18)         | Any          | NR                      | Comparator: Arm 2<br>% : p≥0.05                     | % FPL   |
| Ishdorj, 2013 <sup>66</sup> | NR                    | Arm 1 | Pre-2009  | Proportion - drinks whole milk most often | NA   | 766           | Followup timepoint: Baseline<br>NR (34.3) | NA           | NR                      | Comparator: 2 vs. 1 Whole vs. reduced fat<br>p<0.01 | Child sex, child age, caregiver's education, caregiver's age, ethnicity, recruitment site (ITO vs. state), region |
| Ishdorj, 2013 <sup>66</sup> | NR                    | Arm 2 | Post-2009 | Proportion - drinks whole milk most often | NA   | 876           | Followup timepoint: Baseline<br>NR (16.2) | NA           | NR                      | Comparator: 2 vs. 1 Whole vs. reduced fat<br>p<0.01 | 0   |

CI=confidence interval; FPL=federal poverty level; ITO=Indian Tribal Organizations; n=sample size; NA=not available; NHANES=National Health and Nutrition Examination Survey; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-243. Dietary intake categorical outcomes (milk general) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition                     | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|--|--|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Total milk (Whole, 2%, 1%, or non-fat) | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (85.7) | NR           | NR                      | Comparator: 1 (95% CI: 79.7-90.2), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Total milk (Whole, 2%, 1%, or non-fat) | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (91.1) | NR           | NR                      | Comparator: 2 (95% CI: 80.3-96.3), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

| Author, Year               | Sub-group | Arm   | Arm Name                                      | Outcome Definition                     | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|---|--|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits | Total milk (Whole, 2%, 1%, or non-fat) | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (87.9) | NR           | NR                      | Comparator: 3 (95% CI: 77.0-94.0), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

CI=confidence interval; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC=Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-244. Dietary intake categorical outcomes (milk general) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year               | Sub-group | Arm   | Arm Name          | Outcome Definition                    | Tool | N at Analysis | Follow up Outcome, n(%)   | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|----------------------------|-----------|-------|-------------------|---------------------------------------|------|---------------|---|--------------|-------------------------|----------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 1 | Pre-revision WIC  | Usually consumed by child: other milk | NR   | 3004          | Followup timepoint: July 2009 before WIC revision<br>NR (1.2)   | NR           | NR                      | Comparator: Ref            | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |
| Whaley, 2012 <sup>21</sup> | NR        | Arm 2 | Post-revision WIC | Usually consumed by child: other milk | NR   | 2996          | Followup timepoint: January 2010 after WIC revision<br>NR (1.5) | NR           | NR                      | Comparator: Arm1<br>p=0.65 | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Sub-group | Arm   | Arm Name          | Outcome Definition                 | Tool | N at Analysis | Follow up Outcome, n(%)                                    | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|-------------------|------------------------------------|------|---------------|--|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 1 | Pre-revision WIC  | Usually consumed by child: no milk | NR   | 3004          | Followup timepoint: July 2009 before WIC revision NR (0)   | NR           | NR                      | Comparator: Ref          | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |
| Whaley, 2012 <sup>21</sup> | NR        | Arm 2 | Post-revision WIC | Usually consumed by child: no milk | NR   | 2996          | Followup timepoint: January 2010 after WIC revision NR (0) | NR           | NR                      | Comparator: Arm1 p=1     | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Sub-group | Arm   | Arm Name          | Outcome Definition                    | Tool | N at Analysis | Follow up Outcome, n(%)                                      | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|-------------------|---------------------------------------|------|---------------|--|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 1 | Pre-revision WIC  | Usually consumed by child: other milk | NR   | 3004          | Followup timepoint: July 2009 before WIC revision NR (1.2)   | NR           | NR                      | Comparator: Ref          | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |
| Whaley, 2012 <sup>21</sup> | NR        | Arm 2 | Post-revision WIC | Usually consumed by child: other milk | NR   | 2996          | Followup timepoint: January 2010 after WIC revision NR (1.5) | NR           | NR                      | Comparator: Arm1 p=0.65  | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

| Author, Year               | Sub-group | Arm   | Arm Name          | Outcome Definition                 | Tool | N at Analysis | Follow up Outcome, n(%)                                    | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|----------------------------|-----------|-------|-------------------|------------------------------------|------|---------------|--|--------------|-------------------------|--------------------------|---|
| Whaley, 2012 <sup>21</sup> | NR        | Arm 1 | Pre-revision WIC  | Usually consumed by child: no milk | NR   | 3004          | Followup timepoint: July 2009 before WIC revision NR (0)   | NR           | NR                      | Comparator: Ref          | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |
| Whaley, 2012 <sup>21</sup> | NR        | Arm 2 | Post-revision WIC | Usually consumed by child: no milk | NR   | 2996          | Followup timepoint: January 2010 after WIC revision NR (0) | NR           | NR                      | Comparator: Arm1 p=1     | Breastfeeding; duration household has been on WIC; language preference (English, Spanish); family use of the Supplemental Nutrition Assistance Program in the past year. Did not adjust for sex of respondent because the adjusted values were unduly influenced by the small number of males in the study. Because of missing values, sample sizes varied across variables |

CI=confidence interval; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-245. Dietary intake categorical outcomes (yogurt) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (15) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.77 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (12) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.77 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (25) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.77 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (23) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.77 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (15) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (12) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (25) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (23) | Any          | NR                      | Comparator: Arm 3<br>% : $p \geq 0.05$                                      | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (12) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (23) | Any          | NR                      | Comparator: Arm 2<br>% : $p < 0.05$   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (21) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.63$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (20) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.63$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (27) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.63$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (30) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: $p = 0.63$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Any yogurt         | NR   | NR            | Followup timepoint: NR<br>NR (21) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition | Tool | N at Analysis | Followup Outcome, n(%)         | Outcome Unit | Within-group Difference | Between-group Difference     | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|--------------------|------|---------------|--------------------------------|--------------|-------------------------|------------------------------|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR NR (20) | Any          | NR                      | Comparator: Arm 1 % : p≥0.05 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Any yogurt         | NR   | NR            | Followup timepoint: NR NR (27) | Any          | NR                      | Comparator: Ref              | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR NR (30) | Any          | NR                      | Comparator: Arm 3 % : p≥0.05 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR NR (20) | Any          | NR                      | Comparator: Ref              | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any yogurt         | NR   | NR            | Followup timepoint: NR NR (30) | Any          | NR                      | Comparator: Arm 2 % : p≥0.05 | % FPL            |

FPL=federal poverty level; n=sample size; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-246. Dietary intake categorical outcomes (total dairy) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup | Arm   | Arm Name   | Outcome Definition                       | Tool                               | N at Analysis | Followup Outcome, n(%)   | Within-group Difference | Between-group Difference                        | Adjusted Factors  |
|-----------------------------|----------|-------|--|--|------------------------------------|---------------|--|-------------------------|---|---|
| Hamner , 2019 <sup>32</sup> | NR       | Arm 1 | Children currently receiving WIC benefits            | Total dairy (milk, yogurt, cheese, whey) | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey<br>NR (91.7) | NR                      | Comparator: 1<br>(95% CI: 85.9-95.2),<br>p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner , 2019 <sup>32</sup> | NR       | Arm 2 | Children eligible for but not receiving WIC benefits | Total dairy (milk, yogurt, cheese, whey) | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey<br>NR (94.9) | NR                      | Comparator: 2<br>(95% CI: 85.0-98.4),<br>p=NR   | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner , 2019 <sup>32</sup> | NR       | Arm 3 | Children not eligible to receive WIC benefits        | Total dairy (milk, yogurt, cheese, whey) | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey<br>NR (97.2) | NR                      | Comparator: 3<br>(95% CI: 92.3-99.0),<br>p=NR   | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

CI=confidence interval; n=sample size; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-247. Dietary intake continuous outcomes (milk general) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Subgroup      | Arm   | Arm Name                     | Outcome Definition  | Tool | N                              | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|----------------------------|---------------|-------|------------------------------|---|------|--------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of total milk | NA   | Baseline: 360<br>Followup: 360 | 2011-2014<br>Baseline: NR<br>Followup: Mean 68.1 (SE: 3.5) | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of total milk | NA   | Baseline: 224<br>Followup: 224 | 2011-2014<br>Baseline: NR<br>Followup: Mean 70.4 (SE: 5.2) | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Percent contribution to total food group intake of total milk | NA   | Baseline: 463<br>Followup: 463 | 2011-2014<br>Baseline: NR<br>Followup: Mean 72.7 (SE: 2.2) | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |

N=sample size; NA=not available; NR=not reported; p=p-value; SE=standard error; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-248. Dietary intake continuous outcomes (milk general) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Subgroup | Arm   | Arm Name  | Outcome Definition   | Tool | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-----------------------------|----------|-------|-----------|----------------------|------|-------------------------------|--|--------------|-------------------------|--------------------------|------------------|
| Ishtorj, 2013 <sup>66</sup> | No       | Arm 1 | Pre-2009  | Cups of milk per day | NR   | Baseline: 766<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 2.811 (SD: NR)<br>Followup: NR | NR           | NR                      | Comparator: NR           | NR               |
| Ishtorj, 2013 <sup>66</sup> | No       | Arm 2 | Post-2009 | Cups of milk per day | NR   | Baseline: 876<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 2.788 (SD: NR)<br>Followup: NR | NR           | NR                      | Comparator: NR           | NR               |

Fl oz=fluid ounce; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation

**Evidence Table D-249. Dietary intake continuous outcomes (reduced fat milk) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year             | Sub-group | Arm   | Arm Name         | Outcome Definition   | Tool                 | N                             | Followup Outcome   | Outcome Unit         | Within-group Difference         | Between-group Difference | Adjusted Factors  |
|--------------------------|-----------|-------|------------------|--|----------------------|-------------------------------|--|----------------------|---------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Children  | Arm 1 | Hispanic         | Reduced-fat milk intake (includes 2%, 1%, and non-fat milk) = 1 serving = 8 fl. Oz | 24-hour recall, NDSR | Baseline: 112<br>Followup: 89 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.55 (SD NR)<br>Followup: Mean 0.84 (SD NR) | % > 0 servings / day | % change from baseline: p<0.001 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Children  | Arm 2 | African American | Reduced-fat milk intake (includes 2%, 1%, and non-fat milk) = 1 serving = 8 fl. Oz | 24-hour recall, NDSR | Baseline: 97<br>Followup: 64  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.35 (SD NR)<br>Followup: Mean 0.55 (SD NR) | % > 0 servings / day | % change from baseline: p<0.05  | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |

| Author, Year                    | Sub-group                 | Arm     | Arm Name | Outcome Definition    | Tool                 | N                              | Followup Outcome   | Outcome Unit                       | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|-----------------------|----------------------|--------------------------------|--|------------------------------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children         | Overall | Overall  | Milk, 2%, 1%, non-fat | 24 hour recall (NDS) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.7 (SD 0.9)<br>Followup: Mean 1 (SD 0.8)   | serving/day (one serving is 1 cup) | Mean change from baseline | Comparator: NR           | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | Milk, 2%, 1%, non-fat | 24 hour recall (NDS) | Baseline: 90<br>Followup: 90   | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.4 (SD 0.8)<br>Followup: Mean 0.6 (SD 0.8) | serving/day (one serving is 1 cup) | Mean change from baseline | Comparator: NR           | NR               |

BMI=body mass index; f/u=followup; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; SD=standard deviation; SNAP=Supplemental Nutrition Assistance

**Evidence Table D-250. Dietary intake continuous outcomes (whole milk) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year             | Sub-group | Arm   | Arm Name         | Outcome Definition                       | Tool                 | N                             | Followup Outcome   | Outcome Unit         | Within-group Difference         | Between-group Difference | Adjusted Factors  |
|--------------------------|-----------|-------|------------------|--|----------------------|-------------------------------|--|----------------------|---------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup> | Children  | Arm 1 | Hispanic         | Whole milk intake = 1 serving = 8 fl. Oz | 24-hour recall, NDSR | Baseline: 112<br>Followup: 89 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.59 (SD NR)<br>Followup: Mean 0.1 (SD NR)  | % > 0 servings / day | % change from baseline: p<0.001 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status |
| Kong, 2014 <sup>19</sup> | Children  | Arm 2 | African American | Whole milk intake = 1 serving = 8 fl. Oz | 24-hour recall, NDSR | Baseline: 97<br>Followup: 64  | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.37 (SD NR)<br>Followup: Mean 0.08 (SD NR) | % > 0 servings / day | % change from baseline: p<0.001 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u                       |

| Author, Year                    | Sub-group                 | Arm     | Arm Name | Outcome Definition        | Tool                 | N                              | Followup Outcome   | Outcome Unit                       | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|---------------------------|----------------------|--------------------------------|--|------------------------------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children         | Overall | Overall  | Milk, whole, servings/day | 24 hour recall (NDS) | Baseline: 121<br>Followup: 121 | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.5 (SD 0.7)<br>Followup: Mean 0.2 (SD 0.5) | serving/day (one serving is 1 cup) | Mean change from baseline | Comparator: NR           | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | Milk, whole, servings/day | 24 hour recall (NDS) | Baseline: 90<br>Followup: 90   | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.4 (SD 0.7)<br>Followup: Mean 0.2 (SD 0.5) | serving/day (one serving is 1 cup) | Mean change from baseline | Comparator: NR           | NR               |

BMI=body mass index; fl oz=fluid ounce; f/u=followup; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; SD=standard deviation; SNAP=Supplemental Nutrition Assistance

**Evidence Table D-251. Dietary intake continuous outcomes (cheese and yogurt) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group     | Arm   | Arm Name                     | Outcome Definition  | N                              | Followup Outcome                              | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|----------------------------|---------------|-------|------------------------------|---|--------------------------------|---|--------------|-------------------------|--------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of cheese | Baseline: 360<br>Followup: 360 | Baseline: NR<br>Followup: Mean 22.5 (SE: 3)   | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of cheese | Baseline: 224<br>Followup: 224 | Baseline: NR<br>Followup: Mean 21.8 (SE: 4.9) | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Percent contribution to total food group intake of cheese | Baseline: 463<br>Followup: 463 | Baseline: NR<br>Followup: Mean 20.1 (SE: 1.5) | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of yogurt | Baseline: 360<br>Followup: 360 | Baseline: NR<br>Followup: Mean 8.1 (SE: 1.6)  | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of yogurt | Baseline: 224<br>Followup: 224 | Baseline: NR<br>Followup: Mean 6.6 (SE: 2.1)  | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Percent contribution to total food group intake of yogurt | Baseline: 463<br>Followup: 463 | Baseline: NR<br>Followup: Mean 5.1 (SE: 1)    | %            | Not reported            | Comparator: NA<br>p=NR   | NR               |

N=sample size; NA=not available; NR=not reported; p=p-value; SE=standard error; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-252. Dietary intake continuous outcomes (dairy) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition                   | Tool                       | N   | Followup Outcome  | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|--------------------------------------|----------------------------|---|---|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup>    | NR        | Arm 1 | WIC                  | Dairy component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR   | Baseline: Mean 7.9 (SE 0.2)<br>Followup: NR   | NR                      | Comparator: Arm 2 & 3<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 2 | WIC-Eligible         | Dairy component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR   | Baseline: Mean 7.7 (SE 0.3)<br>Followup: NR   | NR                      | Comparator: Arm 1 & 3<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 3 | Non-WIC              | Dairy component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR   | Baseline: Mean 8.2 (SE 0.2)<br>Followup: NR   | NR                      | Comparator: Arm 1 & 2<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC Participants | Dairy                                | NR                         | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012), Baseline: Mean 8 (SD NR)<br>Followup: Mean 7.4 (SD NR) | NR                      | Comparator: Ref                  | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year               | Sub-group     | Arm   | Arm Name                     | Outcome Definition         | Tool | N   | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|---------------|-------|------------------------------|----------------------------|------|---|---|-------------------------|---|---|
| Tester, 2016 <sup>45</sup> | NR            | Arm 2 | WIC Participants             | Dairy                      | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012), Baseline: Mean 8.2 (SD NR)<br>Followup: Mean 7.9 (SD NR) | NR                      | Comparator: Arm1<br>Ratio of Relative Changes: 1.1 (95% CI: 0.9 to 1.2), p=0.53 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Mean intake of total dairy | NA   | Baseline: 360<br>Followup: 360  | 2011-2014 Baseline: NR<br>Followup: Mean 1.93 (SE: 0.12)  | Not reported            | Comparator: NA<br>p=NR  | NR  |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Mean intake of total dairy | NA   | Baseline: 224<br>Followup: 224  | 2011-2014 Baseline: NR<br>Followup: Mean 2.1 (SE: 0.26)   | Not reported            | Comparator: NA<br>p=NR  | NR  |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Mean intake of total dairy | NA   | Baseline: 463<br>Followup: 463  | 2011-2014 Baseline: NR<br>Followup: Mean 1.8 (SE: 0.1)  | Not reported            | Comparator: NA<br>p=NR  | NR  |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-253. Dietary intake categorical outcomes (refined grains) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Subgroup | Arm   | Arm Name  | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%)                 | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|----------|-------|-----------|-------------------------|------|---------------|--|--------------|-------------------------|----------------------------|------------------|
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 1 | Pre-2009  | Never                   | NA   | 766           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: 2 vs. 1 p<0.01 | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 2 | Post-2009 | Never                   | NA   | 876           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: NR             | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 1 | Pre-2009  | 1-3 times per week      | NA   | 766           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: 2 vs. 1 p<0.01 | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 2 | Post-2009 | 1-3 times per week      | NA   | 876           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: NR             | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 1 | Pre-2009  | 4-7 times per week      | NA   | 766           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: 2 vs. 1 p<0.01 | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 2 | Post-2009 | 4-7 times per week      | NA   | 876           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: NR             | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 1 | Pre-2009  | 2 or more times per day | NA   | 766           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: 2 vs. 1 p<0.01 | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 2 | Post-2009 | 2 or more times per day | NA   | 876           | Followup timepoint: Baseline NR        | NA           | NR                      | Comparator: NR             | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 1 | Pre-2009  | 1-3 times per week      | NA   | 766           | Followup timepoint: Baseline NR (39.1) | NA           | NR                      | Comparator: NR             | NR               |

| <b>Author,<br/>Year</b>        | <b>Subgroup</b> | <b>Arm</b> | <b>Arm<br/>Name</b> | <b>Outcome<br/>Definition</b> | <b>Tool</b> | <b>N at<br/>Analysis</b> | <b>Followup<br/>Outcome,<br/>n(%)</b>           | <b>Outcom<br/>e Unit</b> | <b>Within-<br/>group<br/>Difference</b> | <b>Between-<br/>group<br/>Difference</b> | <b>Adjusted<br/>Factors</b> |
|--------------------------------|-----------------|------------|---------------------|-------------------------------|-------------|--------------------------|---|--------------------------|---|--|-----------------------------|
| Ishdorj,<br>2013 <sup>66</sup> | NR              | Arm 2      | Post-<br>2009       | 1-3 times per<br>week         | NA          | 876                      | Followup<br>timepoint:<br>Baseline<br>NR (35.4) | NA                       | NR                                      | Comparator:<br>NR                        | NR                          |

n=sample size; NA=not available; NR=not reported; p=p-value

**Evidence Table D-254. Dietary intake categorical outcomes (total grains) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                  | Adjusted Factors  |
|----------------------------|-----------|-------|--|--------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Total Grains       | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (85.5) | NR           | NR                      | Comparator: 1 (95% CI: 76.2-91.5), p=NR   | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Total Grains       | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (76.5) | NR           | NR                      | Comparator: 2 (95% CI: 66.6-84.2), p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits                | Total Grains       | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (87.2) | NR           | NR                      | Comparator: 3 (95% CI: 76.3-93.5), p=NR   | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

CI=confidence interval; FPL=federal poverty level; n=sample size; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-255. Dietary intake categorical outcomes (total grains) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group            | Arm   | Arm Name     | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|----------------------|-------|--------------|------------------------------|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR<br>NR (88) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.68 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR<br>NR (93) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.68 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR<br>NR (82) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.68 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR<br>NR (87) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.68 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 1 | 2008 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR<br>NR (88) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR<br>NR (93) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months | Arm 3 | 2016 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR<br>NR (82) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%)         | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|------------------------------|------|---------------|--------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (87) | Any          | NR                      | Comparator: Arm 3 % : $p \geq 0.05$                                   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (93) | Any          | NR                      | Comparator: Ref   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 6 to 11.9 months  | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (87) | Any          | NR                      | Comparator: Arm 2 % : $p \geq 0.05$                                   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (95) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: $p=0.2$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (98) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: $p=0.2$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (95) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: $p=0.2$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (97) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: $p=0.2$ | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (95) | Any          | NR                      | Comparator: Ref   | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%)         | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|------------------------------|------|---------------|--------------------------------|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (98) | Any          | NR                      | Comparator: Arm 1 % : p<0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (95) | Any          | NR                      | Comparator: Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (97) | Any          | NR                      | Comparator: Arm 3 % : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (98) | Any          | NR                      | Comparator: Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (97) | Any          | NR                      | Comparator: Arm 2 % : p≥0.05   | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (94) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: p=0.97 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (95) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: p=0.97 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Any grains or grain products | NR   | NR            | Followup timepoint: NR NR (95) | Any          | NR                      | Comparator: Not applicable P-Value of WIC x Time interaction: p=0.97 | % FPL            |



| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition           | Tool | N at Analysis | Followup Outcome, n(%)                  | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|------------------------------|------|---------------|---|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (95) | Any          | NR                      | Comparator:<br>Not applicable<br>P-Value of WIC<br>x Time<br>interaction:<br>p=0.97 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 1 | 2008 non-WIC | Any grains or grain products | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (94) | Any          | NR                      | Comparator:<br>Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (95) | Any          | NR                      | Comparator:<br>Arm 1<br>% : p≥0.05  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 3 | 2016 non-WIC | Any grains or grain products | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (95) | Any          | NR                      | Comparator:<br>Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (95) | Any          | NR                      | Comparator:<br>Arm 3<br>% : p≥0.05  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 2 | 2008 WIC     | Any grains or grain products | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (95) | Any          | NR                      | Comparator:<br>Ref  | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 24 to 47.9 months | Arm 4 | 2016 WIC     | Any grains or grain products | NR   | NR            | Followup<br>timepoint:<br>NR<br>NR (95) | Any          | NR                      | Comparator:<br>Arm 2<br>% : p≥0.05  | % FPL            |

CI=confidence interval; FPL=federal poverty level; n=sample size; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-256. Dietary intake categorical outcomes (whole grains) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Sub-group       | Arm   | Arm Name                 | Outcome Definition              | Tool                          | N at Analysis | Followup Outcome, n(%)                                  | Outcome Unit | Within-group Difference | Between-group Difference                                       | Adjusted Factors |
|-----------------------------|-----------------|-------|--------------------------|---------------------------------|-------------------------------|---------------|---|--------------|-------------------------|--|------------------|
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 1 | WIC Participant          | Whole grain products (WIC food) | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (70) | NR           | NR                      | Comparator: 1<br>OR: NR (95% CI: NR), p=NR                     | NR               |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 2 | Non-WIC - Lower income   | Whole grain products (WIC food) | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (62) | NR           | NR                      | Comparator: 2<br>OR: 1.42 (1 vs. 2) (95% CI: 0.93, 2.19), p=NR | NR               |
| Guthrie, 2018 <sup>31</sup> | child 6-11.9 mo | Arm 3 | Non- WIC - Higher Income | Whole grain products (WIC food) | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (71) | NR           | NR                      | Comparator: 3<br>OR: 0.93 (1 vs. 3) (95% CI: 0.65, 1.34), p=NR | NR               |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 1 | WIC Participant          | Whole grain products (WIC food) | 24-hour dietary recall - NDSR | 375           | Followup timepoint: 2016 cross-sectional survey NR (51) | NR           | NR                      | Comparator:<br>OR: NR (95% CI: NR), p=NR                       | NR               |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 2 | Non-WIC - Lower income   | Whole grain products (WIC food) | 24-hour dietary recall - NDSR | 169           | Followup timepoint: 2016 cross-sectional survey NR (56) | NR           | NR                      | Comparator:<br>OR: 0.81 (1 vs. 2) (95% CI: 0.45, 1.46), p=NR   | NR               |
| Guthrie, 2018 <sup>31</sup> | child 24-47.9   | Arm 3 | Non- WIC - Higher Income | Whole grain products (WIC food) | 24-hour dietary recall - NDSR | 357           | Followup timepoint: 2016 cross-sectional survey NR (67) | NR           | NR                      | Comparator:<br>OR: 0.51 (1 vs. 3) (95% CI: 0.31, 0.85), p=NR   | NR               |

CI=confidence interval; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-257. Dietary intake categorical outcomes (whole grains) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition      | Tool | N at Analysis | Followup Outcome, n(%)               | Outcome Unit | Within-group Difference | Between-group Difference   | Adjusted Factors |
|-----------------------------|-----------|-------|-----------|-------------------------|------|---------------|--------------------------------------|--------------|-------------------------|----------------------------|------------------|
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | Never                   | NA   | 766           | Followup timepoint: Baseline NR      | NA           | NR                      | Comparator: 2 vs. 1 p<0.01 | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | Never                   | NA   | 876           | Followup timepoint: Baseline NR      | NA           | NR                      | Comparator: NR             | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | 1-3 times per week      | NA   | 766           | Followup timepoint: Baseline NR      | NA           | NR                      | Comparator: 2 vs. 1 p<0.01 | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | 1-3 times per week      | NA   | 876           | Followup timepoint: Baseline NR      | NA           | NR                      | Comparator: NR             | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | 4-7 times per week      | NA   | 766           | Followup timepoint: Baseline NR      | NA           | NR                      | Comparator: 2 vs. 1 p<0.01 | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | 4-7 times per week      | NA   | 876           | Followup timepoint: Baseline NR      | NA           | NR                      | Comparator: NR             | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | 2 or more times per day | NA   | 766           | Followup timepoint: Baseline NR      | NA           | NR                      | Comparator: 2 vs. 1 p<0.01 | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 2 | Post-2009 | 2 or more times per day | NA   | 876           | Followup timepoint: Baseline NR      | NA           | NR                      | Comparator: NR             | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR        | Arm 1 | Pre-2009  | 1-3 times per week      | NA   | 766           | Followup timepoint: Baseline NR (22) | NA           | NR                      | Comparator: NR             | NR               |

| Author,<br>Year                | Sub-<br>group | Arm      | Arm<br>Name   | Outcome<br>Definition | Tool | N at<br>Analysis | Followup<br>Outcome,<br>n(%)                    | Outcome<br>Unit | Within-<br>group<br>Difference | Between-<br>group<br>Difference | Adjusted<br>Factors |
|--------------------------------|---------------|----------|---------------|-----------------------|------|------------------|---|-----------------|--------------------------------|---------------------------------|---------------------|
| Ishdorj,<br>2013 <sup>66</sup> | NR            | Arm<br>2 | Post-<br>2009 | 1-3 times<br>per week | NA   | 876              | Followup<br>timepoint:<br>Baseline<br>NR (28.3) | NA              | NR                             | Comparator:<br>NR               | NR                  |

CI=confidence interval; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-258. Dietary intake categorical outcomes (specific grains: corn tortillas) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Subgroup | Arm   | Arm Name  | Outcome Definition | N at Analysis | Followup Outcome, n(%)                 | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|-----------------------------|----------|-------|-----------|--------------------|---------------|--|--------------|-------------------------|--------------------------|------------------|
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 1 | Pre-2009  | 1-3 times per week | 766           | Followup timepoint: Baseline NR (45)   | NA           | NR                      | Comparator: NR           | NR               |
| Ishdorj, 2013 <sup>66</sup> | NR       | Arm 2 | Post-2009 | 1-3 times per week | 876           | Followup timepoint: Baseline NR (39.9) | NA           | NR                      | Comparator: NR           | NR               |

n=sample size; NA=not available; NR=not reported; p=p-value

**Evidence Table D-259. Dietary intake continuous outcomes (whole grains) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition                         | Tool                       | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference          | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|--|----------------------------|---|--|--------------|-------------------------|-----------------------------------|---|
| Kay, 2021 <sup>35</sup>    | NR        | Arm 1 | WIC                  | Whole grain component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR   | Baseline: Mean 3.7 (SE 0.3)<br>Followup: NR  | NR           | NR                      | Comparator : Arm 2 & 3<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 2 | WIC-Eligible         | Whole grain component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR   | Baseline: Mean 3.6 (SE 0.3)<br>Followup: NR  | NR           | NR                      | Comparator : Arm 1 & 3<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 3 | Non-WIC              | Whole grain component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR   | Baseline: Mean 3.9 (SE 0.3)<br>Followup: NR  | NR           | NR                      | Comparator : Arm 1 & 2<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC Participants | Whole grains                               | NR                         | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 2 (SD NR)<br>Followup: Mean 2.2 (SD NR) | NR           | NR                      | Comparator : Ref                  | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year               | Sub-group     | Arm   | Arm Name                     | Outcome Definition  | Tool | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|---------------|-------|------------------------------|---|------|---|--|--------------|-------------------------|---|---|
| Tester, 2016 <sup>45</sup> | NR            | Arm 2 | WIC Participants             | Whole grains  | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 1.8 (SD NR)<br>Followup: Mean 3 (SD NR) | NR           | NR                      | Comparator : Arm1<br>Ratio of Relative Changes: 1.6 (95% CI: 0.9 to 2.6),<br>p=0.08 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Mean intake of whole grains                                     | NA   | Baseline: 360<br>Followup: 360  | Baseline: NR<br>Followup: Mean 0.53 (SE: 0.07)   | oz eq        | Not reported            | Comparator : NA<br>p=NR   | NR  |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Mean intake of whole grains                                     | NA   | Baseline: 224<br>Followup: 224  | Baseline: NR<br>Followup: Mean 0.45 (SE: 0.09)   | oz eq        | Not reported            | Comparator : NA<br>p=NR   | NR  |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants             | Mean intake of whole grains                                     | NA   | Baseline: 463<br>Followup: 463  | Baseline: NR<br>Followup: Mean 0.62 (SE: 0.06)   | oz eq        | Not reported            | Comparator : NA<br>p=NR   | NR  |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of whole grains | NA   | Baseline: 360<br>Followup: 360  | Baseline: NR<br>Followup: Mean 13.2 (SE: 1.5)  | %            | Not reported            | Comparator : Arm 3<br>p=<0.01   | NR  |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of whole grains | NA   | Baseline: 224<br>Followup: 224  | Baseline: NR<br>Followup: Mean 14.6 (SE: 1.8)  | %            | Not reported            | Comparator : NA<br>p=NR   | NR  |

| Author, Year               | Sub-group     | Arm   | Arm Name         | Outcome Definition  | Tool | N                              | Followup Outcome                              | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors |
|----------------------------|---------------|-------|------------------|---|------|--------------------------------|---|--------------|-------------------------|--------------------------|------------------|
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC Participants | Percent contribution to total food group intake of whole grains | NA   | Baseline: 463<br>Followup: 463 | Baseline: NR<br>Followup: Mean 19.1 (SE: 1.6) | %            | Not reported            | Comparator : NA<br>p=NR  | NR               |

BMI=body mass index; BMR=basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; Oz eq/day=ounce equivalent per day; Oz=ounce; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-260. Dietary intake continuous outcomes (whole grains) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition                     | Tool  | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|-----------|--|---|-------------------------------|--|--------------|-------------------------|--------------------------|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 1 | Fall 2008 | whole grains in oz equivalents per day | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.45 oz eq (SE 0.05)<br>Followup: NR | oz eq/day    | NR                      | Comparator: Ref          | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                | Sub-group | Arm   | Arm Name    | Outcome Definition                     | Tool  | N                             | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|-----------------------------|-----------|-------|-------------|--|---|-------------------------------|--|--------------|-------------------------|---|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 2 | Spring 2010 | whole grains in oz equivalents per day | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.45 oz eq (SE 0.05)<br>Followup: NR | oz eq/day    | NR                      | Comparator: 1 vs. 2<br>means ratio: 1 (95% CI: 0.92 to 1.1), p>0.05 | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                | Sub-group | Arm   | Arm Name  | Outcome Definition   | Tool  | N                             | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference | Adjusted Factors  |
|-----------------------------|-----------|-------|-----------|--|---|-------------------------------|---|--------------|-------------------------|--------------------------|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 1 | Fall 2008 | whole grains in proportion of grains per day (whole/total) | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.1 (SE 0.02)<br>Followup: NR | NA           | NR                      | Comparator: Ref          | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |

| Author, Year                | Sub-group | Arm   | Arm Name    | Outcome Definition   | Tool  | N                             | Followup Outcome  | Outcome Unit         | Within-group Difference        | Between-group Difference  | Adjusted Factors  |
|-----------------------------|-----------|-------|-------------|--|---|-------------------------------|---|----------------------|--------------------------------|---|---|
| Morshed, 2015 <sup>71</sup> | NR        | Arm 2 | Spring 2010 | whole grains in proportion of grains per day (whole/total)   | modified Block Kids 2004 Hispanic FFQ, weekly version | Baseline: 155<br>Followup: NR | Followup timepoint: NR<br>Baseline: Mean: 0.12 (SE 0.02)<br>Followup: NR                                  | NA                   | NR                             | Comparator: 1 vs. 2<br>means ratio: 1.01 (95% CI: 0.98 to 1.04), p>0.05 | "The analysis models for continuous variables are multi-level, mixed-methods analyses of variance and consist of the time variable (pre/post), site as a fixed variable, child ID as a random variable within site; models are further adjusted for misreporting (rTE:BMR), length of day at Head Start, child age, child sex, child BMI category, child race, child ethnicity and mother's education level." |
| Kong, 2014 <sup>19</sup>    | Children  | Arm 1 | Hispanic    | Whole grain intake (1 serving is one slice of bread, 1 oz ready-to-eat cereal, 1/2 c cooked cereal, rice or pasta) | 24-hour recall, NDSR                                  | Baseline: 112<br>Followup: 89 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.7 (SD NR)<br>Followup: Mean 0.75 (SD NR) | % > 0 servings / day | % change from baseline: p>0.05 | Comparator: NR  | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u; acculturation status   |

| Author, Year                    | Sub-group         | Arm     | Arm Name         | Outcome Definition  | Tool                 | N                            | Followup Outcome   | Outcome Unit                       | Within-group Difference        | Between-group Difference | Adjusted Factors  |
|---------------------------------|-------------------|---------|------------------|---|----------------------|------------------------------|--|------------------------------------|--------------------------------|--------------------------|---|
| Kong, 2014 <sup>19</sup>        | Children          | Arm 2   | African American | Whole grain intake (1 serving is one slice of bread, 1 oz ready-to-eat cereal, 1/2 c cooked cereal, rice or pasta)  | 24-hour recall, NDSR | Baseline: 97<br>Followup: 64 | Followup timepoint: 18 months after baseline<br>Baseline: Mean 0.76 (SD NR)<br>Followup: Mean 0.72 (SD NR)                                       | % > 0 servings / day               | % change from baseline: p>0.05 | Comparator: NR           | age at 18 month follow-up, gender (children only), total voucher amount per household, SNAP status at 18 months, BMI status at 18 month f/u |
| Odoms-Young, 2014 <sup>72</sup> | Hispanic Children | Overall | Overall          | includes sweetened soft drinks, fruit drinks, tea, coffee, coffee substitutes, water, and nondairy supplements, including sports drinks. One serving is 8 fluid ounces. | 24 hour recall (NDS) | Baseline: 121<br>Followup:   | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.9 (SD 1)<br>Followup: Mean 1.2 (SD 1.3) | serving/day (one serving is 1 cup) | Mean change from baseline      | Comparator: NR           | 0   |

| Author, Year                    | Sub-group                 | Arm     | Arm Name | Outcome Definition  | Tool                 | N                         | Followup Outcome   | Outcome Unit                       | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|---------------------------|---------|----------|---|----------------------|---------------------------|--|------------------------------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American Children | Overall | Overall  | includes sweetened soft drinks, fruit drinks, tea, coffee, coffee substitutes, water, and nondairy supplements, including sports drinks. One serving is 8 fluid ounces. | 24 hour recall (NDS) | Baseline: 90<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 0.7 (SD 1.2)<br>Followup: Mean 0.8 (SD 1) | serving/day (one serving is 1 cup) | Mean change from baseline | Comparator: NR           | 0                |

BMI=body mass index; BMR=basal metabolic rate; CI=confidence interval; FFQ=Food Frequency Questionnaire; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NR=not reported; Oz eq/day=ounce equivalent per day; Oz=ounce; p=p-value; Ref=reference; SD=standard deviation; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-261. Dietary intake continuous outcomes (refined grains) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name             | Outcome Definition                            | Tool                       | N   | Followup Outcome  | Outcome Unit | Within-group Difference | Between-group Difference         | Adjusted Factors  |
|----------------------------|-----------|-------|----------------------|---|----------------------------|---|---|--------------|-------------------------|----------------------------------|---|
| Kay, 2021 <sup>35</sup>    | NR        | Arm 1 | WIC                  | Refined grains component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 306<br>Followup: NR   | Baseline: Mean 2.2 (SE 0.3)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 2 & 3<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 2 | WIC-Eligible         | Refined grains component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 160<br>Followup: NR   | Baseline: Mean 2.5 (SE 0.3)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1 & 3<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Kay, 2021 <sup>35</sup>    | NR        | Arm 3 | Non-WIC              | Refined grains component of Toddler DQI score | Toddler Diet Quality Index | Baseline: 409<br>Followup: NR   | Baseline: Mean 2.6 (SE 0.3)<br>Followup: NR   | NR           | NR                      | Comparator: Arm 1 & 2<br>p=>0.05 | ever breastfed, WIC participation status, race and ethnicity, fed poverty level, households with one adult and living in urban settings   |
| Tester, 2016 <sup>45</sup> | NR        | Arm 1 | Non-WIC participants | Refined grains                                | NR                         | Baseline: Before WIC Food Package Change (2003–2008): 478<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012), Baseline: Mean 6.2 (SD NR)<br>Followup: Mean 6.8 (SD NR) | NR           | NR                      | Comparator: Ref                  | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |

| Author, Year               | Sub-group     | Arm   | Arm Name                     | Outcome Definition  | Tool | N   | Followup Outcome   | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|----------------------------|---------------|-------|------------------------------|---|------|---|--|--------------|-------------------------|---|---|
| Tester, 2016 <sup>45</sup> | NR            | Arm 2 | WIC participants             | Refined grains  | NR   | Baseline: Before WIC Food Package Change (2003–2008): 719<br>Followup: NR | Followup timepoint: After WIC Food Package Change (2011–2012),<br>Baseline: Mean 6.3 (SD NR)<br>Followup: Mean 6.3 (SD NR) | NR           | NR                      | Comparator: Arm1<br>Ratio of Relative Changes: 0.9 (95% CI: 0.8 to 1.1), p=0.21 | Age, race/ethnicity, gender, and weight status and energy intake of the child; education and marital status of the household respondent; and household income-to-poverty ratio and household food security status |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 1 | Higher income children       | Percent contribution to total food group intake of refined grains | NA   | Baseline: 360<br>Followup: 360  | Baseline: NR<br>Followup: Mean 86.9 (SE: 1.6)  | %            | Not reported            | Comparator: Arm 3<br>p=<0.01  | NR  |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 2 | WIC eligible nonparticipants | Percent contribution to total food group intake of refined grains | NA   | Baseline: 224<br>Followup: 224  | Baseline: NR<br>Followup: Mean 85.4 (SE: 1.8)  | %            | Not reported            | Comparator: NA<br>p=NR  | NR  |
| Zimmer, 2020 <sup>50</sup> | Age 2-4 years | Arm 3 | WIC participants             | Percent contribution to total food group intake of refined grains | NA   | Baseline: 463<br>Followup: 463  | Baseline: NR<br>Followup: Mean 81 (SE: 1.6)  | %            | Not reported            | Comparator: NA<br>p=NR  | NR  |

CI=confidence interval; n=sample size; NA=not available; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-262. Dietary WIC eligible purchase continuous outcomes (dairy) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup                     | Arm     | Outcome Definition                      | Tool                        | N                          | Followup Outcome   | Outcome Unit   | Within-group Difference | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------------|---------|---|-----------------------------|----------------------------|--|--|-------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic (Household)         | Overall | from milk list that included whole milk | Home food available measure | Baseline: 143<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: N=65 (Percent difference 0.45)<br>Followup: N=27 (Percent difference 0.19) | Yes (item in household) vs. No (item not in household) | NR                      | Comparator : NR          | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American (Household) | Overall | from milk list that included whole milk | Home food available measure | Baseline: 130<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: N=83 (Percent difference 0.64)<br>Followup: N=54 (Percent difference 0.42) | Yes (item in household) vs. No (item not in household) | NR                      | Comparator : NR          | NR               |

| Author, Year                    | Subgroup                     | Arm     | Outcome Definition                         | Tool                        | N                          | Followup Outcome  | Outcome Unit   | Within-group Difference | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------------|---------|--|-----------------------------|----------------------------|---|--|-------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic (Household)         | Overall | from list of 2%, 1%, skim or fat-free milk | Home food available measure | Baseline: 143<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: N=100 (Percent difference 0.7)<br>Followup: N=132 (Percent difference 0.92) | Yes (item in household) vs. No (item not in household) | NR                      | Comparator : NR          | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American (Household) | Overall | from list of 2%, 1%, skim or fat-free milk | Home food available measure | Baseline: 130<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: N=64 (Percent difference 0.49)<br>Followup: N=101 (Percent difference 0.78) | Yes (item in household) vs. No (item not in household) | NR                      | Comparator : NR          | NR               |

n=sample size; NR=not reported; p=p-value; Ref=reference; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-263. Dietary WIC eligible purchase continuous outcomes (fruits) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup                     | Arm     | Outcome Definition   | Tool                        | N                             | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------------|---------|--|-----------------------------|-------------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic (Household)         | Overall | Number of WIC eligible fruit in household from list of 25 fruits, not including juices | Home food available measure | Baseline: 143<br>Followup: NR | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 12.4 (SD 4)<br>Followup: Mean 11.9 (SD 3.8) | number       | Mean change from baseline | Comparator: NR           | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American (Household) | Overall | Number of WIC eligible fruit in household from list of 25 fruits, not including juices | Home food available measure | Baseline: 130<br>Followup: NR | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 8.6 (SD 4.2)<br>Followup: Mean 9.2 (SD 3.9) | number       | Mean change from baseline | Comparator: NR           | NR               |

n=sample size; NR=not reported; p=p-value; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-264. Dietary WIC eligible purchase continuous outcomes (fruit juice) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup                     | Arm     | Outcome Definition  | Tool                        | N                             | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------------|---------|---|-----------------------------|-------------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic (Household)         | Overall | from list of 4 types of 100% fruit juice (apple, grape, orange, other), | Home food available measure | Baseline: 143<br>Followup: NR | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 2.6 (SD 0.9)<br>Followup: Mean 2.5 (SD 1.1) | number       | Mean change from baseline | Comparator : NR          | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American (Household) | Overall | from list of 4 types of 100% fruit juice (apple, grape, orange, other), | Home food available measure | Baseline: 130<br>Followup: NR | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 2.3 (SD 1)<br>Followup: Mean 2.7 (SD 1)     | number       | Mean change from baseline | Comparator : NR          | NR               |

n=sample size; NR=not reported; p=p-value; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-265. Dietary WIC eligible purchase continuous outcomes (grains) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup                     | Arm     | Outcome Definition                            | Tool                        | N                          | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------------|---------|---|-----------------------------|----------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic (Household)         | Overall | from list of 3 WIC-eligible whole-grain items | Home food available measure | Baseline: 143<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 1.9 (SD 0.7)<br>Followup: Mean 2.2 (SD 0.7) | number       | Mean change from baseline | Comparator: NR           | NR               |
| Odoms-Young, 2014 <sup>72</sup> | African American (Household) | Overall | from list of 3 WIC-eligible whole-grain items | Home food available measure | Baseline: 130<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 1.5 (SD 0.9)<br>Followup: Mean 1.9 (SD 0.9) | number       | NR                        | Comparator: NR           | NR               |

n=sample size; NR=not reported; p=p-value; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-266. Dietary WIC eligible purchase continuous outcomes (vegetables) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                    | Subgroup             | Arm     | Outcome Definition                                    | Tool   | N                          | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|----------------------|---------|---|--|----------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | Hispanic (Household) | Overall | from list of 25 vegetables (fresh, frozen, or canned) | Home food available measure (Cullen et al, 2004): a questionnaire that consisted of a list of foods, including 25 fruits (fresh, frozen, or canned, not including juices), 4 types of 100% fruit juice (apple, grape, orange, other), 25 vegetables (fresh, frozen, or canned), milk (whole, 2%, 1%, skim or fat-free), and 3 of the whole-grain items offered in the new WIC food packages (whole grain bread, corn tortillas, and brown rice) in Illinois. | Baseline: 143<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 14.9 (SD 4.3)<br>Followup: Mean 15.4 (SD 3.9) | number       | Mean change from baseline | Comparator: NR           | NR               |

| Author, Year                    | Subgroup                     | Arm     | Outcome Definition                                    | Tool   | N                          | Followup Outcome   | Outcome Unit | Within-group Difference   | Between-group Difference | Adjusted Factors |
|---------------------------------|------------------------------|---------|---|--|----------------------------|--|--------------|---------------------------|--------------------------|------------------|
| Odoms-Young, 2014 <sup>72</sup> | African American (Household) | Overall | from list of 25 vegetables (fresh, frozen, or canned) | Home food available measure (Cullen et al, 2004): a questionnaire that consisted of a list of foods, including 25 fruits (fresh, frozen, or canned, not including juices), 4 types of 100% fruit juice (apple, grape, orange, other), 25 vegetables (fresh, frozen, or canned), milk (whole, 2%, 1%, skim or fat-free), and 3 of the whole-grain items offered in the new WIC food packages (whole grain bread, corn tortillas, and brown rice) in Illinois. | Baseline: 130<br>Followup: | Followup timepoint: yes - follow-up assessment 6 months post WIC food package change<br>Baseline: Mean 11.5 (SD 4.5)<br>Followup: Mean 12.9 (SD 4.2) | number       | Mean change from baseline | Comparator: NR           | NR               |

n=sample size; NR=not reported; p=p-value; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-267. Dietary infant feeding practices categorical outcomes (sweets and snacks) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|--|--------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Deserts            | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (64)   | NR           | NR                      | Comparator: 1 (95% CI: 56.7-70.6), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Deserts            | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (68.1) | NR           | NR                      | Comparator: 2 (95% CI: 53.9-79.6), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits                | Deserts            | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (70.7) | NR           | NR                      | Comparator: 3 (95% CI: 59.7-79.8), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |



| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                  | Adjusted Factors  |
|----------------------------|-----------|-------|--|--------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits            | Snacks             | 24-hour dietary recall - USDA AMPM | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (48.5) | NR           | NR                      | Comparator: 1 (95% CI: 39.2-57.9), p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but not receiving WIC benefits | Snacks             | 24-hour dietary recall - USDA AMPM | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (45.9) | NR           | NR                      | Comparator: 2 (95% CI: 32.0-60.5), p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits        | Snacks             | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (69.1) | NR           | NR                      | Comparator: 3 (95% CI: 57.4-78.8), p=NR   | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

CI=confidence interval; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC=Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-268. Dietary infant feeding practices categorical outcomes (sweets and snacks) of studies investigating the Key Question 2 association of the 2009 food package change with infant and child outcomes**

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (78) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.97 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (80) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.97 | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome , n(%)           | Outcome Unit | Within-group Difference | Between-group Difference  | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|---|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (75) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.97 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (77) | Any          | NR                      | Comparator: Not applicable<br>P-Value of WIC x Time interaction: p=0.97 | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome , n(%)           | Outcome Unit | Within-group Difference | Between-group Difference        | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|---------------------------------|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 1 | 2008 non-WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (78) | Any          | NR                      | Comparator: Ref                 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC     | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (80) | Any          | NR                      | Comparator: Arm 1<br>% : p≥0.05 | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name     | Outcome Definition  | Tool | N at Analysis | Followup Outcome , n(%)           | Outcome Unit | Within-group Difference | Between-group Difference               | Adjusted Factors |
|-----------------------------|-----------------------|-------|--------------|---|------|---------------|-----------------------------------|--------------|-------------------------|--|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 3 | 2016 non-WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (75) | Any          | NR                      | Comparator: Ref                        | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC     | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (77) | Any          | NR                      | Comparator: Arm 3<br>% : $p \geq 0.05$ | % FPL            |

| Author, Year                | Sub-group             | Arm   | Arm Name | Outcome Definition  | Tool | N at Analysis | Followup Outcome, n(%)            | Outcome Unit | Within-group Difference | Between-group Difference        | Adjusted Factors |
|-----------------------------|-----------------------|-------|----------|---|------|---------------|-----------------------------------|--------------|-------------------------|---------------------------------|------------------|
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 2 | 2008 WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (80) | Any          | NR                      | Comparator: Ref                 | % FPL            |
| Guthrie, 2020 <sup>65</sup> | Age 12 to 23.9 months | Arm 4 | 2016 WIC | Any sweets, desserts includes sweet baked goods, cereal and nutrition bars, candy, ice cream and other frozen desserts, jellies and jams, milk flavorings, and baby-food desserts and cookies | NR   | NR            | Followup timepoint: NR<br>NR (77) | Any          | NR                      | Comparator: Arm 2<br>% : p≥0.05 | % FPL            |

CI=confidence interval; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-269. Dietary infant feeding practices categorical outcomes (water) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year               | Sub-group | Arm   | Arm Name   | Outcome Definition | Tool                                | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                  | Adjusted Factors  |
|----------------------------|-----------|-------|--|--------------------|-------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 1 | Children currently receiving WIC benefits                    | Water              | 24-hour dietary recall - USDA AMP M | 202           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (74.8) | NR           | NR                      | Comparator: 1 (95% CI: 65.7-82.2), p=NR   | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week.18 All percentages that are presented are weighted. |
| Hamner, 2019 <sup>32</sup> | NR        | Arm 2 | Children eligible for but WIC but not receiving WIC benefits | Water              | 24-hour dietary recall - USDA AMP M | 84            | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (67.6) | NR           | 0                       | Comparator: 2 (95% CI: 56.1-77.4), p≤0.05 | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week.18 All percentages that are presented are weighted. |

| Author, Year               | Sub-group | Arm   | Arm Name                                      | Outcome Definition | Tool                               | N at Analysis | Followup Outcome, n(%)  | Outcome Unit | Within-group Difference | Between-group Difference                | Adjusted Factors  |
|----------------------------|-----------|-------|---|--------------------|------------------------------------|---------------|---|--------------|-------------------------|---|---|
| Hamner, 2019 <sup>32</sup> | NR        | Arm 3 | Children not eligible to receive WIC benefits | Water              | 24-hour dietary recall - USDA AMPM | 132           | Followup timepoint: Dietary data from 2011–2014 NHANES cross-sectional survey NR (82.6) | NR           | NR                      | Comparator: 3 (95% CI: 71.6-89.9), p=NR | Analyses were weighted by using day-1 dietary weights, which adjust for oversampling, nonresponse, noncoverage, and day of the week. <sup>18</sup> All percentages that are presented are weighted. |

CI=confidence interval; n=sample size; NA=not available; NDS= Nutrition Data System; NDSR= Nutrition Data System for Research; NHANES=National Health and Nutrition Examination Survey; NR=not reported; p=p-value; Ref=reference; USDA AMPM=United States Department of Agriculture Automated Multiple-Pass Method; WIC=Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-270. Child development categorical outcomes of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Sub-group | Arm   | Arm Name    | Outcome Definition                                       | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
| Black, 2012 <sup>26</sup> | WIC       | Arm 1 | 0 stressors | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Ref   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 2 | 1 stressor  | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 21567         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 1.71 (95% CI: 1.51-1.94), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 1 | 0 stressors | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Ref   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than  |

| Author, Year              | Sub-group | Arm   | Arm Name    | Outcome Definition                                       | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|-------|-------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
|                           |           |       |             |  |      |               |                                       |                         |   | 2500g, caregiver employment, child age, and mother's age   |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 2 | 1 stressor  | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 2422          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 2 vs. Arm 1<br>OR: 1.18 (95% CI: 0.84-1.66), p=0.05 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 2 | 1 stressor  | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Ref   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arm 3 | 2 stressors | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 9073          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 1.52 (95% CI: 1.26-1.83), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding,  |

| Author, Year              | Sub-group | Arm          | Arm Name                  | Outcome Definition                                       | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|-----------|--------------|---------------------------|--|------|---------------|---------------------------------------|-------------------------|---|--|
|                           |           |              |                           |  |      |               |                                       |                         |   | birth weight greater than 2500g, caregiver employment, child age, and mother's age   |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 2        | 1 stressor                | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Ref   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 3        | 2 stressors               | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 1266          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2<br>OR: 1.93 (95% CI: 1.19-3.14), p>0.06 | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | WIC       | Arms 2 and 1 | 1 stressor or 0 stressors | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Ref   | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver  |

| Author, Year              | Sub-group | Arm          | Arm Name                  | Outcome Definition                                       | Tool | N at Analysis | Followup Outcome, n(%)                | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|-----------|--------------|---------------------------|--|------|---------------|---------------------------------------|-------------------------|--|--|
|                           |           |              |                           |  |      |               |                                       |                         |  | education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age   |
| Black, 2012 <sup>26</sup> | WIC       | Arm 3        | 2 stressors               | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 23661         | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 2.12 (95% CI: 1.79-2.51), $p>0.06$ | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arms 2 and 1 | 1 stressor or 0 stressors | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 2723          | Followup timepoint: NA<br>Outcome: NA | Not reported            | Comparator: Ref  | site, US born mother vs. immigrant, race/ethnicity, marital status, caregiver education level, breastfeeding, birth weight greater than 2500g, caregiver employment, child age, and mother's age |
| Black, 2012 <sup>26</sup> | No WIC    | Arm 3        | 2 stressors               | PEDS - significant concerns for children $\geq$ 4 months | PEDS | 2723          | Followup timepoint: NA                | Not reported            | Comparator: Arm 3 vs. Arm 2 or 1<br>OR: 2.03 (95% CI: 1.32-3.11), $p>0.06$ | site, US born mother vs. immigrant, race/ethnicity,  |

| Author,<br>Year | Sub-<br>group | Arm | Arm<br>Name | Outcome<br>Definition | Tool | N at<br>Analysis | Followup<br>Outcome,<br>n(%) | Within-group<br>Difference | Between-group<br>Difference | Adjusted Factors  |
|-----------------|---------------|-----|-------------|-----------------------|------|------------------|------------------------------|----------------------------|-----------------------------|---|
|                 |               |     |             |                       |      |                  | Outcome:<br>NA               |                            |                             | marital status,<br>caregiver<br>education level,<br>breastfeeding,<br>birth weight<br>greater than<br>2500g, caregiver<br>employment, child<br>age, and mother's<br>age |

CI=confidence interval; CI=confidence interval; n=sample size; NR=not reported; OR=odds ratio; p=p-value; PEDS=Parents' Evaluation of Developmental Status; Ref=reference;  
WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-271. Child development continuous outcomes (development scale) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                 | Subgroup | Arm   | Arm Name                          | Outcome Definition                              | Tool     | N  | Followup Outcome | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|----------|-------|-----------------------------------|---|----------|----|------------------|-------------------------|--|--|
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | Aggregate of Cognitive and Language Development | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | Aggregate of Cognitive and Language Development | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.158 (SE: 0.08), p=significant at 0.05 level | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | Aggregate of Cognitive and Language Development | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | Aggregate of Cognitive and Language Development | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.162 (SE: 0.08), p=significant at 0.05 level | The basic model contains $\Delta$ in standardized BSID-III scores as dependent variable and the following $\Delta$ in time-varying covariates: $\Delta$ WIC, $\Delta$ SNAP, $\Delta$ HV, $\Delta$ child's age in months, $\Delta$ child's weight, $\Delta$ child's hospitalizations indicator, $\Delta$ developmental concerns concerning the child, $\Delta$ participation in WIC, $\Delta$ employment status of the mother, $\Delta$ knowledge of infant development, $\Delta$ marital status of the mother, $\Delta$ income, $\Delta$ Medicaid status, $\Delta$ presence of a |

| Author, Year                 | Subgroup | Arm   | Arm Name                          | Outcome Definition                              | Tool     | N  | Followup Outcome | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------|-------|-----------------------------------|---|----------|----|------------------|-------------------------|---|--|
|                              |          |       |                                   |   |          |    |                  |                         |   | romantic partner, $\Delta$ number of people in the household, $\Delta$ quality of neighborhood, and indicator for $\Delta$ high crime area. In addition, we undertake robustness checks using the following variables: $\Delta$ parent-child interaction score, $\Delta$ indicator for child's illness not requiring a visit to a medical doctor, $\Delta$ indicator for child's evaluation by any health provider for any reason, $\Delta$ emotional stability score, $\Delta$ child's abuse inventory score, $\Delta$ behavioral problems score, $\Delta$ child's abuse potential inventory happiness total score. |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | Aggregate of Cognitive and Language Development | BSID-III | NR | NR               | NR                      | Comparator: Ref   | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | Aggregate of Cognitive and Language Development | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.1 (SE: 0.09), $p>0.10$ | SNAP and Home visitation program engagement;<br>Demographic and Medicaid controls: change in Medicaid status, income, marital status and employment.   |

| Author, Year                 | Subgroup | Arm   | Arm Name                          | Outcome Definition                              | Tool     | N  | Followup Outcome | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------|-------|-----------------------------------|---|----------|----|------------------|-------------------------|---|--|
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | Aggregate of Cognitive and Language Development | BSID-III | NR | NR               | NR                      | Comparator: Ref   | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | Aggregate of Cognitive and Language Development | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.168 (SE: 0.104), p=significant at 0.10 level | SNAP and Home visitation program engagement; Demographic and Medicaid controls: change in Medicaid status, income, marital status and employment. And psychological controls: including maternal knowledge of infant development, parent-child interaction total score, child abuse potential inventory loneliness total score, child abuse potential inventory unhappiness score, behavioral problems total score, child dysfunctional interaction total score, developmental concerns, neighborhood quality, sickness not requiring visit to doctor, evaluation by a health practitioner, and measure of emotional stability total score |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at                  | BSID III Cognitive Development                  | BSID-III | NR | NR               | NR                      | Comparator: Ref   | NR   |



| Author, Year                 | Subgroup | Arm   | Arm Name                          | Outcome Definition             | Tool     | N  | Followup Outcome | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|------------------------------|----------|-------|-----------------------------------|--------------------------------|----------|----|------------------|-------------------------|---|--|
|                              |          |       | age 1, not age 2                  |                                |          |    |                  |                         |   |  |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Cognitive Development | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.063 (SE: 0.09), p>0.10 | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Cognitive Development | BSID-III | NR | NR               | NR                      | Comparator: Ref   | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Cognitive Development | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.065 (SE: 0.09), p>0.10 | SNAP and Home visitation program engagement  |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Cognitive Development | BSID-III | NR | NR               | NR                      | Comparator: Ref   | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Cognitive Development | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.022 (SE: 0.1), p>0.10  | SNAP and Home visitation program engagement;<br>Demographic and Medicaid controls: change in Medicaid status, income, marital status and employment.                   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Cognitive Development | BSID-III | NR | NR               | NR                      | Comparator: Ref   | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Cognitive Development | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.022 (SE: 0.12), p>0.10 | SNAP and Home visitation program engagement;<br>Demographic and Medicaid controls: change in Medicaid status, income, marital status and employment. And psychological |

| Author, Year                 | Subgroup | Arm   | Arm Name                          | Outcome Definition               | Tool     | N  | Followup Outcome | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|----------|-------|-----------------------------------|----------------------------------|----------|----|------------------|-------------------------|--|--|
|                              |          |       |                                   |                                  |          |    |                  |                         |  | controls: including maternal knowledge of infant development, parent-child interaction total score, child abuse potential inventory loneliness total score, child abuse potential inventory unhappiness score, behavioral problems total score, child dysfunctional interaction total score, developmental concerns, neighborhood quality, sickness not requiring visit to doctor, evaluation by a health practitioner, and measure of emotional stability total score |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Receptive Communication | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Receptive Communication | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.255 (SE: 0.08), p=significant at p of 0.001 level | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Receptive Communication | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at                  | BSID III Receptive Communication | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.266   | SNAP and Home visitation program engagement  |

| Author, Year                 | Subgroup | Arm   | Arm Name                          | Outcome Definition               | Tool     | N  | Followup Outcome | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|----------|-------|-----------------------------------|----------------------------------|----------|----|------------------|-------------------------|--|--|
|                              |          |       | age 1 and 2                       |                                  |          |    |                  |                         | (SE: 0.12), p=significant at p of 0.001 level  |  |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Receptive Communication | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Receptive Communication | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.209 (SE: 0.12), p=significant at p of 0.001 level | SNAP and Home visitation program engagement; Demographic and Medicaid controls: change in Medicaid status, income, marital status and employment.  |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Receptive Communication | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Receptive Communication | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.346 (SE: 0.12), p=significant at p of 0.001 level | SNAP and Home visitation program engagement; Demographic and Medicaid controls: change in Medicaid status, income, marital status and employment. And psychological controls: including maternal knowledge of infant development, parent-child interaction total score, child abuse potential inventory loneliness total score, child abuse potential inventory unhappiness score, |

| Author, Year                 | Subgroup | Arm   | Arm Name                          | Outcome Definition                | Tool     | N  | Followup Outcome | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|------------------------------|----------|-------|-----------------------------------|-----------------------------------|----------|----|------------------|-------------------------|--|---|
|                              |          |       |                                   |                                   |          |    |                  |                         |  | behavioral problems total score, child dysfunctional interaction total score, developmental concerns, neighborhood quality, sickness not requiring visit to doctor, evaluation by a health practitioner, and measure of emotional stability total score |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Expressive Communication | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR  |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Expressive Communication | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.11 (SE: 0.08), p>0.10 | NR  |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Expressive Communication | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR  |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Expressive Communication | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.11 (SE: 0.08), p>0.10 | SNAP and Home visitation program engagement   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Expressive Communication | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR  |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Expressive Communication | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.05 (SE: 0.09), p>0.10 | SNAP and Home visitation program engagement;<br>Demographic and Medicaid controls: change in Medicaid status, income,   |

| Author, Year                 | Subgroup | Arm   | Arm Name                          | Outcome Definition                | Tool     | N  | Followup Outcome | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|------------------------------|----------|-------|-----------------------------------|-----------------------------------|----------|----|------------------|-------------------------|--|--|
|                              |          |       |                                   |                                   |          |    |                  |                         |  | marital status and employment.   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 1 | Receiving WIC at age 1, not age 2 | BSID III Expressive Communication | BSID-III | NR | NR               | NR                      | Comparator: Ref  | NR   |
| Bolbocean, 2021 <sup>4</sup> | NR       | Arm 2 | Receiving WIC at age 1 and 2      | BSID III Expressive Communication | BSID-III | NR | NR               | NR                      | Comparator: Arm 1<br>Between arm comparison: 0.127 (SE: 0.104), p>0.10 | SNAP and Home visitation program engagement; Demographic and Medicaid controls: change in Medicaid status, income, marital status and employment. And psychological controls: including maternal knowledge of infant development, parent-child interaction total score, child abuse potential inventory loneliness total score, child abuse potential inventory unhappiness score, behavioral problems total score, child dysfunctional interaction total score, developmental concerns, neighborhood quality, sickness not requiring visit to doctor, evaluation by a health practitioner, and measure of emotional stability total score |

BSID-III= Bayley Scales of Infant and Toddler Development Third Edition; HV=home visitation; N=sample size; NR=not reported; p=p-value; Ref= reference; SE=standard error;  
SNAP=Supplemental Nutrition Assistance Program; WIC=Special Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-272. Child development continuous outcomes (behavioral development) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                   | Subgroup | Arm                          | Arm Name                     | Outcome Definition                           | Tool  | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------------|----------|------------------------------|------------------------------|--|---|------------------------------|--|-------------------------|---|---|
| Lakshmanan, 2020 <sup>36</sup> | NR       | Enrollment in WIC            | Enrollment in WIC            | mean among those enrolled in WIC             | Vineland Adaptive Behavioral Scales, second edition (VABS-II) | Baseline: 52<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: 82 (SD 15)<br>Risk difference: 10.1 (95% CI: 1.9-19.1 ), p<0.05 | Infant age in months, race/ethnicity,   |
| Lakshmanan, 2020 <sup>36</sup> | NR       | Not enrolled in WIC          | Not enrolled in WIC          | mean among those not enrolled in WIC         | Vineland Adaptive Behavioral Scales, second edition (VABS-II) | Baseline: 19<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: 77 (SD 17), p=NR  | Maternal education, language, birth weight, neonatal comorbidity, postdischarge diagnosis, use of medical equipment, and enrolment in early intervention. |
| Lakshmanan, 2020 <sup>36</sup> | NR       | Enrollment in WIC and SNAP   | Enrollment in WIC and SNAP   | mean among those enrolled in WIC + SNAP      | Vineland Adaptive Behavioral Scales, second edition (VABS-II) | Baseline: 15<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: 81 (SD 15)<br>Risk difference: 10.3 (95% CI: 0.9-19.7 ), p=0.05 | Infant age in months, race/ethnicity,   |
| Lakshmanan, 2020 <sup>36</sup> | NR       | Not enrolled in WIC and SNAP | Not enrolled in WIC and SNAP | mean among those not enrolled in WIC OR SNAP | Vineland Adaptive Behavioral Scales, second edition (VABS-II) | Baseline: 37<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: 77 (SD 17), p=NR  | Maternal education, language, birth weight, neonatal comorbidity, postdischarge diagnosis, use of medical equipment, and enrolment in early intervention. |

CI=confidence interval; n=sample size; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance; VABS-II=Vineland Adaptive Behavioral Scales, second edition; WIC= Supplemental Nutrition Program for Women, Infants, and Children



**Evidence Table D-273. Child development continuous outcomes (cognitive development) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup      | Arm   | Arm Name          | Outcome Definition        | Tool                               | N                              | Followup Outcome   | Within-group Difference  | Between-group Difference | Adjusted Factors   |
|-----------------------------|---------------|-------|-------------------|---------------------------|------------------------------------|--------------------------------|--|--|--------------------------|--|
| Jackson, 2015 <sup>33</sup> | WIC unexposed | Arm 1 | ECLS-OLS analysis | Bayley mental development | Bayley Short Form-Research Edition | Baseline: NR<br>Followup: 6120 | Followup timepoint: age 2<br>Baseline: NR<br>Followup: NR                        | arm includes WIC eligible participants and non participants , which are compared here p=REF  | Comparator: NR           | child race, sex, number of siblings, maternal age at birth, mom immigrant, household poverty ratio, maternal education, unmarried, mother employment, food stamps, Medicaid, TANF, smoked during pregnancy |
| Jackson, 2015 <sup>33</sup> | WIC exposed   | Arm 1 | ECLS-OLS analysis | Bayley mental development | Bayley Short Form-Research Edition | Baseline: NR<br>Followup: 6120 | Followup timepoint: age 2<br>Baseline: NR<br>Followup: z score: 0.0686 (SD 0.03) | arm includes WIC eligible participants and non participants , which are compared here p<0.05 | Comparator: NR           | child race, sex, number of siblings, maternal age at birth, mom immigrant, household poverty ratio, maternal education, unmarried, mother employment, food stamps, Medicaid, TANF, smoked during pregnancy |

| Author, Year                    | Subgroup      | Arm   | Arm Name               | Outcome Definition               | Tool  | N                              | Followup Outcome   | Within-group Difference   | Between-group Difference  | Adjusted Factors   |
|---------------------------------|---------------|-------|------------------------|----------------------------------|---|--------------------------------|--|---|---|--|
| Jackson, 2015 <sup>33</sup>     | WIC unexposed | Arm 2 | ECLS-Matching analysis | Bayley mental development        | Bayley Short Form-Research Edition  | Baseline: NR<br>Followup: 5323 | Followup timepoint: age 2<br>Baseline: NR<br>Followup: NR)                       | arm includes matched WIC eligible participants and non participants<br>p=REF  | Comparator: NR  | child race, sex, number of siblings, maternal age at birth, mom immigrant, household poverty ratio, maternal education, unmarried, mother employment, food stamps, Medicaid, TANF, smoked during pregnancy |
| Jackson, 2015 <sup>33</sup>     | WIC exposed   | Arm 2 | ECLS-Matching analysis | Bayley mental development        | Bayley Short Form-Research Edition  | Baseline: NR<br>Followup: 5323 | Followup timepoint: age 2<br>Baseline: NR<br>Followup: z score: 0.0625 (SD 0.03) | arm includes matched WIC eligible participants and non participants<br>p<0.05 | Comparator: NR  | child race, sex, number of siblings, maternal age at birth, mom immigrant, household poverty ratio, maternal education, unmarried, mother employment, food stamps, Medicaid, TANF, smoked during pregnancy |
| Lakshmana n, 2020 <sup>36</sup> | NR            | 0     | Enrollment in WIC      | mean among those enrolled in WIC | Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) | Baseline: 52<br>Followup: NR   | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR                           | NR  | Comparator: 1<br>Mean difference from baseline: 90 (SD 17)<br>Risk difference: 11.7 (95% CI: 1.2-22.2 ), p<0.05 | infant age in months, race/ethnicity,  |

| Author, Year                   | Subgroup | Arm | Arm Name                     | Outcome Definition                           | Tool  | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference  | Adjusted Factors  |
|--------------------------------|----------|-----|------------------------------|--|---|------------------------------|--|-------------------------|---|---|
| Lakshmana n,2020 <sup>36</sup> | NR       | 0   | Not enrolled in WIC          | mean among those not enrolled in WIC         | Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) | Baseline: 19<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: 84 (SD 18), p=NR  | maternal education, language, birth weight, neonatal comorbidity, postdischarge diagnosis, use of medical equipment, and enrolment in early intervention. |
| Lakshmana n,2020 <sup>36</sup> | NR       | 0   | Enrollment in WIC and SNAP   | mean among those enrolled in WIC + SNAP      | Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) | Baseline: 15<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: 90 (SD 17)<br>Risk difference: 11.5 (95% CI: 0.1-22.9 ), p<0.05 | infant age in months, race/ethnicity,   |
| Lakshmana n,2020 <sup>36</sup> | NR       | 0   | Not enrolled in WIC and SNAP | mean among those not enrolled in WIC OR SNAP | Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) | Baseline: 37<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: 84 (SD 18), p=NR  | maternal education, language, birth weight, neonatal comorbidity, postdischarge diagnosis, use of medical equipment, and enrolment in early intervention. |

| Author, Year             | Subgroup | Arm   | Arm Name  | Outcome Definition                    | Tool                                | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference    | Adjusted Factors  |
|--------------------------|----------|-------|-----------|---------------------------------------|-------------------------------------|------------------------------|--|-------------------------|-----------------------------|---|
| Guan, 2021 <sup>30</sup> | No       | Arm 1 | Pre-2009  | Bayley: Cognitive composite score     | Bayley Scales of Infant Development | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref             | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | No       | Arm 2 | Post-2009 | Bayley: Cognitive composite score     | Bayley Scales of Infant Development | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>p=NS | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | No       | Arm 1 | Pre-2009  | Bayley: Receptive communication score | Bayley Scales of Infant Development | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref             | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

| Author, Year             | Subgroup | Arm   | Arm Name  | Outcome Definition                    | Tool                                | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference      | Adjusted Factors  |
|--------------------------|----------|-------|-----------|---------------------------------------|-------------------------------------|------------------------------|--|-------------------------|-------------------------------|---|
| Guan, 2021 <sup>30</sup> | No       | Arm 2 | Post-2009 | Bayley: Receptive communication score | Bayley Scales of Infant Development | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>p<0.01 | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | No       | Arm 1 | Pre-2009  | Bayley: Total language subset         | Bayley Scales of Infant Development | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref               | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | No       | Arm 2 | Post-2009 | Bayley: Total language subset         | Bayley Scales of Infant Development | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>p=NS   | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

| Author, Year             | Subgroup | Arm   | Arm Name  | Outcome Definition   | Tool                        | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference    | Adjusted Factors  |
|--------------------------|----------|-------|-----------|----------------------|-----------------------------|------------------------------|--|-------------------------|-----------------------------|---|
| Guan, 2021 <sup>30</sup> | No       | Arm 1 | Pre-2009  | Cognitive Test Score | Stanford-Binet Intelligence | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref             | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | No       | Arm 2 | Post-2009 | Cognitive Test Score | Stanford-Binet Intelligence | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>p=NS | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

CI=confidence interval; ECLS= Early Childhood Longitudinal Program; n=sample size; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-274. Child development continuous outcomes (motor development) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                   | Subgroup | Arm   | Arm Name                     | Outcome Definition                           | Tool  | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors                     |
|--------------------------------|----------|-------|------------------------------|--|---|------------------------------|--|-------------------------|--|--------------------------------------|
| Lakshmanan ,2020 <sup>36</sup> | NR       | Arm 1 | Enrollment in WIC            | mean among those enrolled in WIC             | Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) | Baseline: 52<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: 82 (SD 21)<br>Risk difference: NR (95% CI: NR), p=0.35 | adjusted result were not significant |
| Lakshmanan ,2020 <sup>36</sup> | NR       | Arm 2 | Not enrolled in WIC          | mean among those not enrolled in WIC         | Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) | Baseline: 19<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: 77 (SD 24), p=NR                                       | NR                                   |
| Lakshmanan ,2020 <sup>36</sup> | NR       | Arm 3 | Enrollment in WIC and SNAP   | mean among those enrolled in WIC + SNAP      | Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) | Baseline: 15<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 1<br>Mean difference from baseline: 81 (SD 21)<br>Risk difference: NR (95% CI: NR), p=0.67 | adjusted result were not significant |
| Lakshmanan ,2020 <sup>36</sup> | NR       | Arm 4 | Not enrolled in WIC and SNAP | mean among those not enrolled in WIC OR SNAP | Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) | Baseline: 37<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2<br>Mean difference from baseline: 79 (SD 24), p=NR                                       | NR                                   |

CI=confidence interval; n=sample size; NR=not reported; p=p-value; Ref=reference; SD=standard deviation; SNAP=Supplemental Nutrition Assistance; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-275. Child development continuous outcomes (social development) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year              | Subgroup                       | Arm     | Arm Name                | Outcome Definition   | Tool                    | N                              | Followup Outcome  | Within-group Difference | Between-group Difference   | Adjusted Factors   |
|---------------------------|--------------------------------|---------|-------------------------|--|-------------------------|--------------------------------|---|-------------------------|--|--|
| Arons, 2016 <sup>23</sup> | NR                             | Overall | Full sample             | Within child fixed effects of WIC participation on BITSEA competence score | BITSEA competence score | Baseline: 606<br>Followup: 606 | Followup timepoint: 24 months<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparing effects of WIC participation in a time-varying model. See notes. Mean difference from baseline: 0.22 (SE 0.39), $p>0.05$ | Child age, income, maternal stress and mental health, maternal marital status, maternal education, food stamp participation and child abuse-potential scores |
| Arons, 2016 <sup>23</sup> | African Americans only         | Overall | Full sample/subanalysis | Within child fixed effects of WIC participation on BITSEA competence score | BITSEA competence score | Baseline: 532<br>Followup: 532 | Followup timepoint: 24 months<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparing effects of WIC participation in a time-varying model. See notes. Mean difference from baseline: 0.43 (SE 0.42), $p>0.05$ | Child age, income, maternal stress and mental health, maternal marital status, maternal education, food stamp participation and child abuse-potential scores |
| Arons, 2016 <sup>23</sup> | Prenatal WIC Participants only | Overall | Full sample/subanalysis | Within child fixed effects of WIC participation on BITSEA competence score | BITSEA competence score | Baseline: 555<br>Followup: 555 | Followup timepoint: 24 months<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparing effects of WIC participation in a time-varying model. See notes. Mean difference from baseline: 0.27 (SE 0.4), $p>0.05$  | Child age, income, maternal stress and mental health, maternal marital status, maternal education, food stamp participation and child abuse-potential scores |



| Author, Year              | Subgroup                       | Arm     | Arm Name                | Outcome Definition  | Tool                 | N                              | Followup Outcome  | Within-group Difference | Between-group Difference  | Adjusted Factors   |
|---------------------------|--------------------------------|---------|-------------------------|---|----------------------|--------------------------------|---|-------------------------|---|--|
| Arons, 2016 <sup>23</sup> | NR                             | Overall | Full sample             | Within child fixed effects of WIC participation on BITSEA Problem score | BITSEA Problem score | Baseline: 606<br>Followup: 606 | Followup timepoint: 24 months<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparing effects of WIC participation in a time-varying model. See notes. Mean difference from baseline: -0.58 (SE 0.79), p>0.05 | Child age, income, maternal stress and mental health, maternal marital status, maternal education, food stamp participation and child abuse-potential scores |
| Arons, 2016 <sup>23</sup> | African Americans only         | Overall | Full sample/subanalysis | Within child fixed effects of WIC participation on BITSEA Problem score | BITSEA Problem score | Baseline: 532<br>Followup: 532 | Followup timepoint: 24 months<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparing effects of WIC participation in a time-varying model. See notes. Mean difference from baseline: -0.18 (SE 0.8), p>0.05  | Child age, income, maternal stress and mental health, maternal marital status, maternal education, food stamp participation and child abuse-potential scores |
| Arons, 2016 <sup>23</sup> | Prenatal WIC Participants only | Overall | Full sample/subanalysis | Within child fixed effects of WIC participation on BITSEA Problem score | BITSEA Problem score | Baseline: 555<br>Followup: 555 | Followup timepoint: 24 months<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Comparing effects of WIC participation in a time-varying model. See notes. Mean difference from baseline: -0.6 (SE 0.83), p>0.05  | Child age, income, maternal stress and mental health, maternal marital status, maternal education, food stamp participation and child abuse-potential scores |

| Author, Year             | Subgroup | Arm   | Arm Name  | Outcome Definition                 | Tool  | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference    | Adjusted Factors  |
|--------------------------|----------|-------|-----------|------------------------------------|---|------------------------------|--|-------------------------|-----------------------------|---|
| Guan, 2021 <sup>30</sup> | No       | Arm 1 | Pre-2009  | BITSEA: Problem total at 12 months | Brief Infant Toddler Social Emotional Assessment (BITSEA) | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref             | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | No       | Arm 2 | Post-2009 | BITSEA: Problem total at 12 months | Brief Infant Toddler Social Emotional Assessment (BITSEA) | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>p=NS | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | No       | Arm 1 | Pre-2009  | BITSEA: Problem total at 24 months | Brief Infant Toddler Social Emotional Assessment (BITSEA) | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref             | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |

| Author, Year             | Subgroup | Arm   | Arm Name  | Outcome Definition                    | Tool  | N                            | Followup Outcome                                       | Within-group Difference | Between-group Difference   | Adjusted Factors  |
|--------------------------|----------|-------|-----------|---------------------------------------|---|------------------------------|--|-------------------------|--|---|
| Guan, 2021 <sup>30</sup> | No       | Arm 2 | Post-2009 | BITSEA: Problem total at 24 months    | Brief Infant Toddler Social Emotional Assessment (BITSEA) | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>p=NS  | Mother's age, educational attainment, marital status, race, receipt of Medicaid during pregnancy, household size, household income, total # of pregnancies, child's sex, year of delivery |
| Guan, 2021 <sup>30</sup> | No       | Arm 1 | Pre-2009  | BITSEA: Competency total at 24 months | Brief Infant Toddler Social Emotional Assessment (BITSEA) | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: Ref  | 0   |
| Guan, 2021 <sup>30</sup> | No       | Arm 2 | Post-2009 | BITSEA: Competency total at 24 months | Brief Infant Toddler Social Emotional Assessment (BITSEA) | Baseline: NR<br>Followup: NR | Followup timepoint: NR<br>Baseline: NR<br>Followup: NR | NR                      | Comparator: 2 vs. 1<br>$\beta$ coefficient: -0.12<br>(95% CI: -0.80 to 0.57), p=NS | 0   |

BITSEA=Brief Infant Toddler Social Emotional Assessment; CI=confidence interval; n=sample size; NR=not reported; NS=non-significant; p=p-value; Ref=reference; SE=standard error; WIC= Supplemental Nutrition Program for Women, Infants, and Children

**Evidence Table D-276. Child development continuous outcomes (academic development) of studies investigating the Key Question 2 association between infant and child outcomes and WIC participation compared with eligible non-participants**

| Author, Year                | Subgroup      | Arm   | Arm Name               | Outcome Definition | Tool   | N                             | Followup Outcome   | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|-----------------------------|---------------|-------|------------------------|--------------------|--|-------------------------------|--|---|--------------------------|---|
| Jackson, 2015 <sup>33</sup> | WIC unexposed | Arm 3 | PSID-CDS - FE analysis | Applied problems   | Woodcock-Johnson Revised math achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: REF                      | arm includes/compares siblings who vary in their timing of WIC exposure<br>p=REF  | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |
| Jackson, 2015 <sup>33</sup> | WIC exposed   | Arm 3 | PSID-CDS - FE analysis | Applied problems   | Woodcock-Johnson Revised math achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: z score: 0.091 (SD 0.12) | arm includes/compares siblings who vary in their timing of WIC exposure<br>p>0.05 | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |

| Author, Year                | Subgroup      | Arm   | Arm Name                           | Outcome Definition | Tool   | N                             | Followup Outcome   | Within-group Difference                                  | Between-group Difference | Adjusted Factors  |
|-----------------------------|---------------|-------|------------------------------------|--------------------|--|-------------------------------|--|--|--------------------------|---|
| Jackson, 2015 <sup>33</sup> | WIC unexposed | Arm 4 | PSID-CDS - between-family analysis | Applied problems   | Woodcock-Johnson Revised math achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: REF                      | arm compares families who vary in WIC exposure<br>p=REF  | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |
| Jackson, 2015 <sup>33</sup> | WIC exposed   | Arm 4 | PSID-CDS - between-family analysis | Applied problems   | Woodcock-Johnson Revised math achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: z score: 0.029 (SD 0.11) | arm compares families who vary in WIC exposure<br>p>0.05 | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |

| Author, Year                | Subgroup      | Arm   | Arm Name               | Outcome Definition | Tool  | N                             | Followup Outcome  | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|-----------------------------|---------------|-------|------------------------|--------------------|---|-------------------------------|---|---|--------------------------|---|
| Jackson, 2015 <sup>33</sup> | WIC unexposed | Arm 3 | PSID-CDS - FE analysis | Broad reading      | Woodcock-Johnson Revised reading achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: REF                     | comparing siblings who vary in their timing of WIC exposure<br>p=REF                  | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |
| Jackson, 2015 <sup>33</sup> | WIC exposed   | Arm 3 | PSID-CDS - FE analysis | Broad reading      | Woodcock-Johnson Revised reading achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: z score: 0.26 (SD 0.11) | comparing siblings who vary in their timing of WIC exposure<br>WIC Exposure<br>p<0.05 | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |

| Author, Year                | Subgroup      | Arm   | Arm Name                           | Outcome Definition | Tool  | N                             | Followup Outcome   | Within-group Difference                                  | Between-group Difference | Adjusted Factors  |
|-----------------------------|---------------|-------|------------------------------------|--------------------|---|-------------------------------|--|--|--------------------------|---|
| Jackson, 2015 <sup>33</sup> | WIC unexposed | Arm 4 | PSID-CDS - between-family analysis | Broad reading      | Woodcock-Johnson Revised reading achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: REF                      | arm compares families who vary in WIC exposure<br>p=REF  | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |
| Jackson, 2015 <sup>33</sup> | WIC exposed   | Arm 4 | PSID-CDS - between-family analysis | Broad reading      | Woodcock-Johnson Revised reading achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: z score: 0.197 (SD 0.09) | arm compares families who vary in WIC exposure<br>p<0.05 | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |

| Author, Year                | Subgroup      | Arm   | Arm Name               | Outcome Definition         | Tool  | N                             | Followup Outcome   | Within-group Difference   | Between-group Difference | Adjusted Factors  |
|-----------------------------|---------------|-------|------------------------|----------------------------|---|-------------------------------|--|---|--------------------------|---|
| Jackson, 2015 <sup>33</sup> | WIC unexposed | Arm 3 | PSID-CDS - FE analysis | Letter-word identification | Woodcock-Johnson Revised reading achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: REF                      | arm includes/compares siblings who vary in their timing of WIC exposure<br>p=REF  | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |
| Jackson, 2015 <sup>33</sup> | WIC exposed   | Arm 3 | PSID-CDS - FE analysis | Letter-word identification | Woodcock-Johnson Revised reading achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: z score: 0.256 (SD 0.12) | arm includes/compares siblings who vary in their timing of WIC exposure<br>p<0.05 | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |



| Author, Year                | Subgroup      | Arm   | Arm Name                           | Outcome Definition         | Tool  | N                             | Followup Outcome   | Within-group Difference                                  | Between-group Difference | Adjusted Factors  |
|-----------------------------|---------------|-------|------------------------------------|----------------------------|---|-------------------------------|--|--|--------------------------|---|
| Jackson, 2015 <sup>33</sup> | WIC unexposed | Arm 4 | PSID-CDS - between-family analysis | Letter-word identification | Woodcock-Johnson Revised reading achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: REF                      | arm compares families who vary in WIC exposure<br>p=REF  | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |
| Jackson, 2015 <sup>33</sup> | WIC exposed   | Arm 4 | PSID-CDS - between-family analysis | Letter-word identification | Woodcock-Johnson Revised reading achievement test | Baseline: NR<br>Followup: 263 | Followup timepoint: 2002 (avg. child age 11 yrs)<br>Baseline: NR<br>Followup: z score: 0.194 (SD 0.09) | arm compares families who vary in WIC exposure<br>p<0.05 | Comparator: NR           | age in 2002, sex, race, # kids in household, maternal education, marital status (as birth and 2002), mother employment status (at birth and 2002), household poverty ratio (at birth and 2001), other program participation (birth year); younger sibling |

CI=confidence interval; FE=fixed effects; n=sample size; NR=not reported; p=p-value; PSID-CDS=Panel Study of Income Dynamics-Child Development Supplement; Ref=reference; SD=standard deviation; WIC= Supplemental Nutrition Program for Women, Infants, and Children

## References for Appendix D

1. Angley M, Thorsten VR, Drews-Botsch C, et al. Association of participation in a supplemental nutrition program with stillbirth by race, ethnicity, and maternal characteristics. *BMC Pregnancy Childbirth*. 2018 Jul 24;18(1):306. doi: 10.1186/s12884-018-1920-0. PMID: 30041624.
2. Baer RJ, Altman MR, Oltman SP, et al. Maternal factors influencing late entry into prenatal care: a stratified analysis by race or ethnicity and insurance status. *J Matern Fetal Neonatal Med*. 2019 Oct;32(20):3336-42. doi: 10.1080/14767058.2018.1463366. PMID: 29631462.
3. Bersak T, Sonchak-Ardan L. Marginal changes, marginal impacts: The limits of changes to WIC and their ability to influence breastfeeding rates. *Children & Youth Services Review*. 2021;126:N.PAG-N.PAG. doi: 10.1016/j.childyouth.2021.106043. PMID: 150850754. Language: English. Entry Date: 20210623. Revision Date: 20210623. Publication Type: Article.
4. Bolbocean C, Tylavsky FA. The impact of safety net programs on early-life developmental outcomes. *Food Policy*. 2021;100doi: 10.1016/j.foodpol.2020.102018.
5. El-Bastawissi AY, Peters R, Sasseen K, et al. Effect of the Washington Special Supplemental Nutrition Program for Women, Infants and Children (WIC) on pregnancy outcomes. *Matern Child Health J*. 2007 Nov;11(6):611-21. doi: 10.1007/s10995-007-0212-5. PMID: 17562153.
6. Fingar KR, Lob SH, Dove MS, et al. Reassessing the Association between WIC and Birth Outcomes Using a Fetuses-at-Risk Approach. *Matern Child Health J*. 2017 Apr;21(4):825-35. doi: 10.1007/s10995-016-2176-9. PMID: 27531011.
7. Gleason S, Wilkin MK, Sallack L, et al. Breastfeeding Duration Is Associated With WIC Site-Level Breastfeeding Support Practices. *J Nutr Educ Behav*. 2020 Jul;52(7):680-7. doi: 10.1016/j.jneb.2020.01.014. PMID: 32171671.
8. Hamad R, Batra A, Karasek D, et al. The Impact of the Revised WIC Food Package on Maternal Nutrition During Pregnancy and Postpartum. *Am J Epidemiol*. 2019 Aug 1;188(8):1493-502. doi: 10.1093/aje/kwz098. PMID: 31094428.
9. Kasim MT, Ukert B. The impact of WIC participation on tobacco use and alcohol consumption. *Contemporary Economic Policy*. 2021;39(3):608-25. doi: 10.1111/coep.12525.
10. Ma X, Liu J, Smith M. WIC participation and breastfeeding in South Carolina: updates from PRAMS 2009-2010. *Matern Child Health J*. 2014 Jul;18(5):1271-9. doi: 10.1007/s10995-013-1362-2. PMID: 24057992.
11. McCoy MB, Geppert J, Dech L, et al. Associations Between Peer Counseling and Breastfeeding Initiation and Duration: An Analysis of Minnesota Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). *Matern Child Health J*. 2018 Jan;22(1):71-81. doi: 10.1007/s10995-017-2356-2. PMID: 28755046.
12. Rhee J, Fabian MP, Ettinger de Cuba S, et al. Effects of Maternal Homelessness, Supplemental Nutrition Programs, and Prenatal PM(2.5) on Birthweight. *Int J Environ Res Public Health*. 2019 Oct 28;16(21)doi: 10.3390/ijerph16214154. PMID: 31661898.
13. Sonchak L. The Impact of WIC on Birth Outcomes: New Evidence from South Carolina. *Matern Child Health J*. 2016 Jul;20(7):1518-25. doi: 10.1007/s10995-016-1951-y. PMID: 26976280.
14. Sonchak L. The impact of WIC on breastfeeding initiation and gestational weight gain: Case study of South Carolina Medicaid mothers. *Children and Youth Services Review*. 2017;79:115-25. doi: 10.1016/j.childyouth.2017.05.024.

15. Soneji S, Beltrán-Sánchez H. Association of Special Supplemental Nutrition Program for Women, Infants, and Children With Preterm Birth and Infant Mortality. *JAMA Netw Open*. 2019 Dec 2;2(12):e1916722. doi: 10.1001/jamanetworkopen.2019.16722. PMID: 31800070.
16. Testa A, Jackson DB. Incarceration Exposure During Pregnancy and Infant Health: Moderation by Public Assistance. *J Pediatr*. 2020 Jun 23doi: 10.1016/j.jpeds.2020.06.055. PMID: 32590000.
17. Zhang Q, Chen C, Xue H, et al. Revisiting the Relationship between WIC Participation and Breastfeeding among Low-Income Children in the U.S. after the 2009 WIC Food Package Revision. *Food Policy*. 2021 May;101doi: 10.1016/j.foodpol.2021.102089. PMID: 34054198.
18. Hamad R, Collin DF, Baer RJ, et al. Association of Revised WIC Food Package With Perinatal and Birth Outcomes: A Quasi-Experimental Study. *JAMA Pediatr*. 2019 Jul 1;173(9):845-52. doi: 10.1001/jamapediatrics.2019.1706. PMID: 31260072.
19. Kong A, Odoms-Young AM, Schiffer LA, et al. The 18-month impact of special supplemental nutrition program for women, infants, and children food package revisions on diets of recipient families. *Am J Prev Med*. 2014 Jun;46(6):543-51. doi: 10.1016/j.amepre.2014.01.021. PMID: 24842730.
20. Oberle MM, Freese R, Shults J, et al. Impact of the 2009 WIC Food Package Changes on Maternal Dietary Quality. *Journal of Hunger and Environmental Nutrition*. 2020doi: 10.1080/19320248.2020.1724227.
21. Whaley SE, Ritchie LD, Spector P, et al. Revised WIC food package improves diets of WIC families. *J Nutr Educ Behav*. 2012 May-Jun;44(3):204-9. doi: 10.1016/j.jneb.2011.09.011. PMID: 22406013.
22. Andreyeva T, Tripp AS. The healthfulness of food and beverage purchases after the federal food package revisions: The case of two New England states. *Prev Med*. 2016 Oct;91:204-10. doi: 10.1016/j.ypmed.2016.08.018. PMID: 27527573.
23. Arons A, Bolbocean C, Bush NR, et al. Participation in the special supplemental nutrition program for women, infants, and children is not associated with early childhood socioemotional development: Results from a longitudinal cohort study. *Prev Med Rep*. 2016 Dec;4:507-11. doi: 10.1016/j.pmedr.2016.09.004. PMID: 27688993.
24. Barrera CM, Hamner HC, Perrine CG, et al. Timing of Introduction of Complementary Foods to US Infants, National Health and Nutrition Examination Survey 2009-2014. *J Acad Nutr Diet*. 2018 Mar;118(3):464-70. doi: 10.1016/j.jand.2017.10.020. PMID: 29307590.
25. Bersak T, Sonchak L. The Impact of WIC on Infant Immunizations and Health Care Utilization. *Health Serv Res*. 2018 Aug;53 Suppl 1(Suppl Suppl 1):2952-69. doi: 10.1111/1475-6773.12810. PMID: 29194615.
26. Black MM, Quigg AM, Cook J, et al. WIC participation and attenuation of stress-related child health risks of household food insecurity and caregiver depressive symptoms. *Arch Pediatr Adolesc Med*. 2012 May;166(5):444-51. doi: 10.1001/archpediatrics.2012.1. PMID: 22566545.
27. Casillas SM, Bednarczyk RA. Missed Opportunities for Hepatitis A Vaccination, National Immunization Survey-Child, 2013. *J Pediatr*. 2017 Aug;187:265-71.e1. doi: 10.1016/j.jpeds.2017.04.001. PMID: 28483064.
28. Fang D, Thomsen MR, Nayga RM, Jr., et al. WIC Participation and Relative Quality of Household Food Purchases: Evidence from FoodAPS. *Southern Economic Journal*. 2019;86(1):83-105. doi: 10.1002/soej.12363.

29. Gu X, Tucker KL. Dietary quality of the US child and adolescent population: trends from 1999 to 2012 and associations with the use of federal nutrition assistance programs. *Am J Clin Nutr.* 2017 Jan;105(1):194-202. doi: 10.3945/ajcn.116.135095. PMID: 27881390.
30. Guan A, Hamad R, Batra A, et al. The Revised WIC Food Package and Child Development: A Quasi-Experimental Study. *Pediatrics.* 2021 Feb;147(2)doi: 10.1542/peds.2020-1853. PMID: 33495370.
31. Guthrie JF, Catellier DJ, Jacquier EF, et al. WIC and non-WIC Infants and Children Differ in Usage of Some WIC-Provided Foods. *J Nutr.* 2018 Sep 1;148(suppl\_3):1547s-56s. doi: 10.1093/jn/nxy157. PMID: 30247584.
32. Hamner HC, Paolicelli C, Casavale KO, et al. Food and Beverage Intake From 12 to 23 Months by WIC Status. *Pediatrics.* 2019 Mar;143(3)doi: 10.1542/peds.2018-2274. PMID: 30733238.
33. Jackson MI. Early childhood WIC participation, cognitive development and academic achievement. *Soc Sci Med.* 2015 Feb;126:145-53. doi: 10.1016/j.socscimed.2014.12.018. PMID: 25555255.
34. Jun S, Catellier DJ, Eldridge AL, et al. Usual Nutrient Intakes from the Diets of US Children by WIC Participation and Income: Findings from the Feeding Infants and Toddlers Study (FITS) 2016. *J Nutr.* 2018 Sep 1;148(9s):1567s-74s. doi: 10.1093/jn/nxy059. PMID: 29878136.
35. Kay MC, Duffy EW, Harnack LJ, et al. Kay MC, Duffy EW, Harnack LJ, Anater AS, Hampton JC, Eldridge AL, Story M. Development and Application of a Total Diet Quality Index for Toddlers. *Nutrients.* 2021;13(6):1943. doi: 10.3390/nu13061943.
36. Lakshmanan A, Song AY, Flores-Fenlon N, et al. Association of WIC Participation and Growth and Developmental Outcomes in High-Risk Infants. *Clin Pediatr (Phila).* 2020 Jan;59(1):53-61. doi: 10.1177/0009922819884583. PMID: 31672064.
37. Li K, Wen M, Reynolds M, et al. WIC Participation and Breastfeeding after the 2009 WIC Revision: A Propensity Score Approach. *Int J Environ Res Public Health.* 2019 Jul 24;16(15)doi: 10.3390/ijerph16152645. PMID: 31344937.
38. Litvak J, Parekh N, Juul F, et al. Food assistance programs and income are associated with the diet quality of grocery purchases for households consisting of women of reproductive age or young children. *Prev Med.* 2020 Sep;138:106149. doi: 10.1016/j.ypmed.2020.106149. PMID: 32473261.
39. Ng SW, Hollingsworth BA, Busey EA, et al. Federal Nutrition Program Revisions Impact Low-income Households' Food Purchases. *Am J Prev Med.* 2018 Mar;54(3):403-12. doi: 10.1016/j.amepre.2017.12.003. PMID: 29455757.
40. Oh M, Jensen HH, Rahkovsky I. Did revisions to the wic program affect household expenditures on whole grains? *Applied Economic Perspectives and Policy.* 2016;38(4):578-98. doi: 10.1093/aep/aepp020.
41. Oropesa RS, Landale NS, Dávila AL. Poverty, prenatal care, and infant health in Puerto Rico. *Soc Biol.* 2001 Spring-Summer;48(1-2):44-66. doi: 10.1080/19485565.2001.9989027. PMID: 12194447.
42. Perkins S, Daley A, Yerxa K, et al. The Effectiveness of the Expanded Food and Nutrition Education Program (EFNEP) on Diet Quality as Measured by the Healthy Eating Index. *Am J Lifestyle Med.* 2020 May-Jun;14(3):316-25. doi: 10.1177/1559827619872733. PMID: 32477034.
43. Smock L, Martelon M, Metallinos-Katsaras E, et al. Recovery From Malnutrition Among Refugee Children Following Participation in the Special Supplemental Nutrition for Women, Infants, and Children (WIC) Program in Massachusetts, 1998-2010. *J Public Health Manag Pract.* 2020 Jan/Feb;26(1):71-9. doi: 10.1097/phh.0000000000000995. PMID: 30969273.

44. Stewart H, McLaughlin PW, Dong D, et al. WIC Households' Bread and Cold Cereal Purchases: When They Use Benefits Versus Paying Out of Pocket. *Am J Health Promot*. 2019 Jan;33(1):79-86. doi: 10.1177/0890117118778243. PMID: 29847997.
45. Tester JM, Leung CW, Crawford PB. Revised WIC Food Package and Children's Diet Quality. *Pediatrics*. 2016 May;137(5)doi: 10.1542/peds.2015-3557. PMID: 27244804.
46. Thomas TN, Kolasa MS, Zhang F, et al. Assessing immunization interventions in the Women, Infants, and Children (WIC) program. *Am J Prev Med*. 2014 Nov;47(5):624-8. doi: 10.1016/j.amepre.2014.06.017. PMID: 25217817.
47. Vercammen KA, Moran AJ, Zatz LY, et al. 100% Juice, Fruit, and Vegetable Intake Among Children in the Special Supplemental Nutrition Program for Women, Infants, and Children and Nonparticipants. *Am J Prev Med*. 2018 Jul;55(1):e11-e8. doi: 10.1016/j.amepre.2018.04.003. PMID: 29776784.
48. Weinfield NS, Borger C, Gola AA. Breastfeeding Duration in a Low-Income Sample Is Associated With Child Diet Quality at Age Three. *J Hum Lact*. 2020 Feb 24;890334420903029. doi: 10.1177/0890334420903029. PMID: 32091965.
49. Weinfield NS, Borger C, Au LE, et al. Longer Participation in WIC Is Associated with Better Diet Quality in 24-Month-Old Children. *J Acad Nutr Diet*. 2020 Jun;120(6):963-71. doi: 10.1016/j.jand.2019.12.012. PMID: 32067936.
50. Zimmer MC, Vernarelli JA. Select Food Group Intake of US Children Aged 2 to 4 Years by WIC Participation Status and Income. *J Acad Nutr Diet*. 2020 Dec;120(12):2032-8.e1. doi: 10.1016/j.jand.2020.07.027. PMID: 33222884.
51. Anderson CE, Crespi CM, Wang MC, et al. The neighborhood food environment modifies the effect of the 2009 WIC food package change on childhood obesity in Los Angeles County, California. *BMC Public Health*. 2020 May 13;20(1):678. doi: 10.1186/s12889-020-08779-2. PMID: 32404069.
52. Anderson CE, Whaley SE, Crespi CM, et al. Every month matters: longitudinal associations between exclusive breastfeeding duration, child growth and obesity among WIC-participating children. *J Epidemiol Community Health*. 2020 Jul 1doi: 10.1136/jech-2019-213574. PMID: 32611693.
53. Andreyeva T, Luedicke J. Federal food package revisions: effects on purchases of whole-grain products. *Am J Prev Med*. 2013 Oct;45(4):422-9. doi: 10.1016/j.amepre.2013.05.009. PMID: 24050418.
54. Andreyeva T, Luedicke J, Tripp AS, et al. Effects of reduced juice allowances in food packages for the women, infants, and children program. *Pediatrics*. 2013 May;131(5):919-27. doi: 10.1542/peds.2012-3471. PMID: 23629613.
55. Andreyeva T, Luedicke J, Henderson KE, et al. The positive effects of the revised milk and cheese allowances in the special supplemental nutrition program for women, infants, and children. *J Acad Nutr Diet*. 2014 Apr;114(4):622-30. doi: 10.1016/j.jand.2013.08.018. PMID: 24210878.
56. Andreyeva T, Luedicke J. Incentivizing fruit and vegetable purchases among participants in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Public Health Nutr*. 2015 Jan;18(1):33-41. doi: 10.1017/s1368980014000512. PMID: 24809502.
57. Chaparro MP, Crespi CM, Anderson CE, et al. The 2009 Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food package change and children's growth trajectories and obesity in Los Angeles County. *Am J Clin Nutr*. 2019 May 1;109(5):1414-21. doi: 10.1093/ajcn/nqy347. PMID: 31011750.

58. Chaparro MP, Anderson CE, Crespi CM, et al. The effect of the 2009 WIC food package change on childhood obesity varies by gender and initial weight status in Los Angeles County. *Pediatr Obes*. 2019 Sep;14(9):e12526. doi: 10.1111/ijpo.12526. PMID: 30942561.
59. Chaparro MP, Anderson CE, Crespi CM, et al. The new child food package is associated with reduced obesity risk among formula fed infants participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in Los Angeles County, California, 2003-2016. *Int J Behav Nutr Phys Act*. 2020 Feb 10;17(1):18. doi: 10.1186/s12966-020-0921-3. PMID: 32041634.
60. Chaparro MP, Wang MC, Anderson CE, et al. The Association between the 2009 WIC Food Package Change and Early Childhood Obesity Risk Varies by Type of Infant Package Received. *J Acad Nutr Diet*. 2020 Mar;120(3):371-85. doi: 10.1016/j.jand.2019.09.014. PMID: 31831385.
61. Chaparro MP, Whaley SE, Anderson CE, et al. The role of income and neighbourhood poverty in the association between the 2009 Special Supplemental Nutrition Program for Women, Infants and Children (WIC) food package change and child obesity among WIC-participating children in Los Angeles County, 2003-2016. *Public Health Nutr*. 2020 Dec 22:1-8. doi: 10.1017/s1368980020005200. PMID: 33349277.
62. Chiasson MA, Scheinmann R, Hartel D, et al. Predictors of Obesity in a Cohort of Children Enrolled in WIC as Infants and Retained to 3 Years of Age. *J Community Health*. 2016 Feb;41(1):127-33. doi: 10.1007/s10900-015-0077-2. PMID: 26280211.
63. Daepp MIG, Gortmaker SL, Wang YC, et al. WIC Food Package Changes: Trends in Childhood Obesity Prevalence. *Pediatrics*. 2019 May;143(5):doi: 10.1542/peds.2018-2841. PMID: 30936251.
64. Freedman DS, Sharma AJ, Hamner HC, et al. Trends in Weight-for-Length Among Infants in WIC From 2000 to 2014. *Pediatrics*. 2017 Jan;139(1):doi: 10.1542/peds.2016-2034. PMID: 27965380.
65. Guthrie JF, Anater AS, Hampton JC, et al. The Special Supplemental Nutrition Program for Women, Infants, and Children is Associated with Several Changes in Nutrient Intakes and Food Consumption Patterns of Participating Infants and Young Children, 2008 Compared with 2016. *J Nutr*. 2020 Nov 19;150(11):2985-93. doi: 10.1093/jn/nxaa265. PMID: 33024989.
66. Ishdorj A, Capps Jr O. The effect of revised WIC food packages on native American children. *American Journal of Agricultural Economics*. 2013;95(5):1266-72. doi: 10.1093/ajae/aat030.
67. Joyce T, Reeder J. Changes in breastfeeding among WIC Participants following implementation of the new food package. *Matern Child Health J*. 2015 Apr;19(4):868-76. doi: 10.1007/s10995-014-1588-7. PMID: 25095768.
68. Langellier BA, Chaparro MP, Wang MC, et al. The new food package and breastfeeding outcomes among women, infants, and children participants in Los Angeles County. *Am J Public Health*. 2014 Feb;104 Suppl 1(Suppl 1):S112-8. doi: 10.2105/ajph.2013.301330. PMID: 24354843.
69. Lee F, Edmunds LS, Cong X, et al. Trends in Breastfeeding Among Infants Enrolled in the Special Supplemental Nutrition Program for Women, Infants and Children - New York, 2002-2015. *MMWR Morb Mortal Wkly Rep*. 2017 Jun 16;66(23):610-4. doi: 10.15585/mmwr.mm6623a4. PMID: 28617769.
70. Meiqari L, Torre L, Gazmararian JA. Exploring the Impact of the New WIC Food Package on Low-Fat Milk Consumption Among WIC Recipients: A Pilot Study. *J Health Care Poor Underserved*. 2015 Aug;26(3):712-25. doi: 10.1353/hpu.2015.0092. PMID: 26320907.

71. Morshed AB, Davis SM, Greig EA, et al. Effect of WIC Food Package Changes on Dietary Intake of Preschool Children in New Mexico. *Health Behav Policy Rev.* 2015 Jan;2(1):3-12. doi: 10.14485/hbpr.2.1.1. PMID: 27668264.
72. Odoms-Young AM, Kong A, Schiffer LA, et al. Evaluating the initial impact of the revised Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food packages on dietary intake and home food availability in African-American and Hispanic families. *Public Health Nutr.* 2014 Jan;17(1):83-93. doi: 10.1017/s1368980013000761. PMID: 23544992.
73. Pan L, Freedman DS, Park S, et al. Changes in Obesity Among US Children Aged 2 Through 4 Years Enrolled in WIC During 2010-2016. *Jama.* 2019 Jun 18;321(23):2364-6. doi: 10.1001/jama.2019.5051. PMID: 31211336.
74. Pan L, Freedman DS, Sharma AJ, et al. Trends in Obesity Among Participants Aged 2-4 Years in the Special Supplemental Nutrition Program for Women, Infants, and Children - United States, 2000-2014. *MMWR Morb Mortal Wkly Rep.* 2016 Nov 18;65(45):1256-60. doi: 10.15585/mmwr.mm6545a2. PMID: 27855143.
75. Pan L, Blanck HM, Galuska DA, et al. Changes in High Weight-for-Length among Infants Enrolled in Special Supplemental Nutrition Program for Women, Infants, and Children during 2010–2018. *Childhood Obesity.* 2021;17(6):408-19. doi: 10.1089/chi.2021.0055. PMID: 152009661. Language: English. Entry Date: 20210830. Revision Date: 20210830. Publication Type: Article.
76. Thornton HE, Crixell SH, Reat AM, et al. Differences in energy and micronutrient intakes among Central Texas WIC infants and toddlers after the package change. *J Nutr Educ Behav.* 2014 May-Jun;46(3 Suppl):S79-86. doi: 10.1016/j.jneb.2014.02.005. PMID: 24810001.
77. Whaley SE, Koleilat M, Whaley M, et al. Impact of policy changes on infant feeding decisions among low-income women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Am J Public Health.* 2012 Dec;102(12):2269-73. doi: 10.2105/ajph.2012.300770. PMID: 23078467.
78. Wilde P, Wolf A, Fernandes M, et al. Food-package assignments and breastfeeding initiation before and after a change in the Special Supplemental Nutrition Program for Women, Infants, and Children. *Am J Clin Nutr.* 2012 Sep;96(3):560-6. doi: 10.3945/ajcn.112.037622. PMID: 22836028.
79. Zimmer MC, Vernarelli JA. Changes in nutrient and food group intakes among children and women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children: findings from the 2005-2008 and 2011-2014 National Health and Nutrition Examination Surveys. *Public Health Nutr.* 2019 Dec;22(18):3309-14. doi: 10.1017/s1368980019002702. PMID: 31566166.
80. Hromi-Fiedler A, Chapman D, Segura-Pérez S, et al. Barriers and Facilitators to Improve Fruit and Vegetable Intake Among WIC-Eligible Pregnant Latinas: An Application of the Health Action Process Approach Framework. *J Nutr Educ Behav.* 2016 Jul-Aug;48(7):468-77.e1. doi: 10.1016/j.jneb.2016.04.398. PMID: 27373861.
81. Anderson CK, Walch TJ, Lindberg SM, et al. Excess Gestational Weight Gain in Low-Income Overweight and Obese Women: A Qualitative Study. *J Nutr Educ Behav.* 2015 Sep-Oct;47(5):404-11.e1. doi: 10.1016/j.jneb.2015.05.011. PMID: 26187348.
82. Kim LP, Koleilat M, Whaley SE. A Qualitative Study to Examine Perceptions and Barriers to Appropriate Gestational Weight Gain among Participants in the Special Supplemental Nutrition Program for Women Infants and Children Program. *J Pregnancy.* 2016;2016:4569742. doi: 10.1155/2016/4569742. PMID: 27403341.

83. Robson SM, DeLuccia R, Baker S, et al. Qualitative Research on the Real-Time Decision Making of WIC Participants While Food Shopping: Use of Think-Aloud Methodology. *J Acad Nutr Diet*. 2020 Jan;120(1):111-9. doi: 10.1016/j.jand.2019.05.009. PMID: 31307943.
84. Weber SJ, Wichelecki J, Chavez N, et al. Understanding the factors influencing low-income caregivers' perceived value of a federal nutrition programme, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). *Public Health Nutr*. 2019 Apr;22(6):1056-65. doi: 10.1017/s1368980018003336. PMID: 30522548.
85. Bertmann FM, Barroso C, Ohri-Vachaspati P, et al. Women, infants, and children cash value voucher (CVV) use in Arizona: a qualitative exploration of barriers and strategies related to fruit and vegetable purchases. *J Nutr Educ Behav*. 2014 May-Jun;46(3 Suppl):S53-8. doi: 10.1016/j.jneb.2014.02.003. PMID: 24809997.
86. Beck AL, Takayama JJ, Halpern-Felsher B, et al. Understanding how Latino parents choose beverages to serve to infants and toddlers. *Matern Child Health J*. 2014 Aug;18(6):1308-15. doi: 10.1007/s10995-013-1364-0. PMID: 24077961.
87. Gleason S, Pooler J. The Effects of Changes in WIC Food Packages on Redemptions. Contractor and Cooperator Report No. 69 Altarum Institute. 2011. <https://naldc.nal.usda.gov/download/50613/PDF>
88. Isaacs S, Shriver L, Haldeman L. Qualitative analysis of maternal barriers and perceptions to participation in a federal supplemental nutrition program in rural appalachian North Carolina. *J Appalachian Health*. 2020;2(4):37–52. doi: doi.org/10.13023/jah.0204.06.
89. Almeida R, Alvarez Gutierrez S, Whaley SE, et al. A Qualitative Study of Breastfeeding and Formula-Feeding Mothers' Perceptions of and Experiences in WIC. *J Nutr Educ Behav*. 2020 Jun;52(6):615-25. doi: 10.1016/j.jneb.2019.12.006. PMID: 31955996.
90. Schindler-Ruwisch J, Roess A, Robert RC, et al. Determinants of Breastfeeding Initiation and Duration Among African American DC WIC Recipients: Perspectives of Recent Mothers. *Womens Health Issues*. 2019 Nov-Dec;29(6):513-21. doi: 10.1016/j.whi.2019.07.003. PMID: 31409521.
91. Scott A, Shreve M, Ayers B, et al. Breastfeeding perceptions, beliefs and experiences of Marshallese migrants: an exploratory study. *Public Health Nutr*. 2016 Nov;19(16):3007-16. doi: 10.1017/s1368980016001221. PMID: 27230629.
92. Gross TT, Powell R, Anderson AK, et al. WIC peer counselors' perceptions of breastfeeding in African American women with lower incomes. *J Hum Lact*. 2015 Feb;31(1):99-110. doi: 10.1177/0890334414561061. PMID: 25480019.
93. Hohl S, Thompson B, Escareño M, et al. Cultural Norms in Conflict: Breastfeeding Among Hispanic Immigrants in Rural Washington State. *Maternal & Child Health Journal*. 2016;20(7):1549-57. doi: 10.1007/s10995-016-1954-8. PMID: 116170891. Language: English. Entry Date: 20160622. Revision Date: 20170703. Publication Type: Article.
94. Bedwell RM. The Impact of Federal Breastfeeding Policy Initiatives on Women's Breastfeeding Practices and Attitudes in Southern Indiana. *Journal of Poverty*. 2017;21(6):508-27. doi: 10.1080/10875549.2017.1348423.



95. Ruiz M, Arroyo H, Dávila Torres R, et al.  
Qualitative Study on WIC Program  
Strategies to Promote Breastfeeding  
Practices in Puerto Rico: What do  
Nutritionist/Dietician's [sic] Think?  
Maternal & Child Health Journal.  
2011;15(4):520-6. doi: 10.1007/s10995-010-  
0592-9.