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Future Research Needs for Childhood Obesity Prevention Programs



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Future Research Needs for Childhood Obesity Prevention Programs

Identification of Future Research Needs From Comparative Effectiveness Review No. 115

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Addendum to Future Research Needs Report for Childhood Obesity Prevention Programs

This report was posted for public comment from June 10, 2013 to July 8, 2013 on the Effective Health Care Web site. We received one set of comments from the American Therapy Association (APTA). The comments were related to gaps outside the scope of the original systematic review including the study of children with special health care needs; the limited number and perspectives of the stakeholder group; and the impact of these stakeholder perspectives on the final list of highest priority research needs. While we acknowledge the many research needs in this area, the scope of this report was constrained by that of the original systematic review. These comments were considered, and no changes were made in this report.

This report is based on research conducted by the Johns Hopkins University Evidence-based Practice Center (EPC) under contract to the Agency for Healthcare Research and Quality (AHRQ), Rockville, MD (Contract No. 290-2007-10061-I). The findings and conclusions in this document are those of the author(s), who are responsible for its contents; the findings and conclusions do not necessarily represent the views of AHRQ. Therefore, no statement in this report should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services.

The information in this report is intended to help health care researchers and funders of research make well-informed decisions in designing and funding research and thereby improve the quality of health care services. This report is not intended to be a substitute for the application of scientific judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical research and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances.

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None of the investigators have any affiliation or financial involvement that conflicts with the material presented in this report.

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies and strategies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

An important part of evidence reports is to not only synthesize the evidence, but also to identify the gaps in evidence that limited the ability to answer the systematic review questions. AHRQ supports EPCs to work with various stakeholders to identify and prioritize the future research that is needed by decisionmakers. This information is provided for researchers and funders of research in these Future Research Needs papers. These papers are made available for public comment and use and may be revised.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality. The evidence reports undergo public comment prior to their release as a final report.

We welcome comments on this Future Research Needs document. They may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, or by email to epc@ahrq.hhs.gov.

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Executive Summary

Background

Context

Childhood obesity is highly prevalent in the United States (U.S.)¹ and has become a global epidemic.² The recent national survey, the 2007-2008 National Health and Nutrition Examination Survey (NHANES) data showed that 17 percent of U.S. children and adolescents (ages 2–19) years were obese, and over 30 percent were overweight or obese.³⁻⁶ Childhood obesity leads to obesity in adulthood and many other serious health conditions, such as cardiovascular, metabolic, and psychosocial illnesses.²

To assess the effectiveness of existing childhood obesity prevention efforts, the Johns Hopkins University Evidence-based Practice Center completed a systematic review on childhood obesity prevention studies conducted in high-income countries.⁷ This report, funded by the Agency for Healthcare Research and Quality (AHRQ), systematically reviewed seven Key Questions (see Table A).

Table A. Key Questions from “Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis”

Number	Question
KQ 1	What is the comparative effectiveness of school-based interventions for the prevention of obesity or overweight in children?
KQ 2	What is the comparative effectiveness of home-based interventions for the prevention of obesity or overweight in children?
KQ 3	What is the comparative effectiveness of primary care-based interventions for the prevention of obesity or overweight in children?
KQ 4	What is the comparative effectiveness of childcare setting-based interventions for the prevention of obesity or overweight in children?
KQ 5	What is the comparative effectiveness of community-based or environment-level interventions for the prevention of obesity or overweight in children?
KQ 6	What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or overweight in children?
KQ 7	What is the comparative effectiveness of multi-setting interventions for the prevention of obesity or overweight in children?

Abbreviation: KQ = Key Question

The draft Comparative Effectiveness Review evaluated 96 intervention studies reported in 113 articles with the following main conclusions:

- The majority of studies in high income countries are conducted in schools.
- School-based intervention can prevent overweight and obesity, especially those with a home intervention that targets both diet and physical activity.

Though the strength of evidence is moderate to high for school-based interventions, the limited number of studies and insufficient or low strength of evidence to support interventions in other settings made it difficult to conclude that interventions in other settings could effectively prevent childhood obesity. Based on the evidence gaps in these settings, we identified the following as Future Research Needs:

Future research is needed on interventions delivered in settings other than schools or home. Thus, future research is needed for all of the Key Questions except for Key Questions 1 and 2, and especially needed are studies of environmental and policy changes.

While there have been other reviews on the effectiveness of interventions on food and nutrition policies at school on changes in children's diet and school food environments, there are still gaps in the literature on some aspects, such as the impact of regulations on food availability and its impact on obesity prevention. Only a few studies that we reviewed used social marketing to deliver messages on nutrition, physical activity and health. This approach might be integrated with other intervention components to create an atmosphere favorable to healthy and active lifestyles and related behavioral changes. Additionally, further testing of the value of consumer health informatics products for obesity prevention is needed. In addition, there is a lack of evidence on the impact of regional or national policies on childhood obesity prevention, including agriculture policy and regulations on food retailing and distributions.

Furthermore, further research might be conducted with stratified analyses on subgroups, such as by gender, age, race/ethnicity, or socioeconomic status. This will help us learn how different groups may respond differently to the same intervention, and help tailor future interventions to maximize their benefits.

There were methodological limitations of the reviewed studies which suggest that future research might improve upon the methods. Few of the studies we reviewed reported process evaluation, which would provide useful insight regarding why some studies might detect desirable effect of the intervention. More vigorous analytic approaches are desirable in future studies, to better analyze the repeated measures collected during follow-up, to control for confounders, and to test effect modification.

The studies we reviewed typically had limited followup and we could not know the sustainability of these interventions. Future studies need to design innovative approaches that have a high likelihood of sustainability; for example, studies using a community-based participatory approach. This may be designed to take advantage of other existing public health, government or other organization supported programs or try to gain more support and engagement from related key stakeholders.

The objective of this report is to prioritize the needs for research addressing gaps in the existing literature on the effectiveness of childhood obesity prevention programs by engaging expert stakeholders using a modified Delphi method.

Methods

We identified research gaps from areas of low or insufficient strength in Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis.⁷ All Key Questions from that evidence report, except Key Questions 1 and 2, were considered gaps in the literature. We used a modified Delphi process with six expert stakeholders to prioritize individual PICOS elements (populations; interventions, comparisons of interventions; outcomes; settings) to identify Future Research Needs for childhood obesity prevention.

We recruited a variety of stakeholders with potential interest in childhood obesity prevention such as parents, researchers, and representatives from government and public agencies. Stakeholders were recruited via letters, emails, and phone invitations. They were asked to participate in a Delphi process using a Web-based assessment tool. Stakeholders were asked to read the Executive Summary of the 2012 draft evidence report "Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis" as a guide to prioritize

evidence gaps. Stakeholders were allowed to enter free-text comments during the prioritization process to provide us insight into their thought processes; however, free-text was optional so these comments were not used in prioritization.

Round 1

Stakeholders were asked to rate the highest and lowest priority populations, interventions, intermediate outcomes, and settings for future research in childhood obesity prevention. Populations were defined on the basis of age (all ages, toddlers, young children, adolescents), race/ethnicity (all races/ethnicities, Black, Hispanic, Native American, white), and socioeconomic status (all income levels, low, middle, high). Interventions were defined as dietary, physical activity, or both. Intermediate outcomes were defined as nutrition knowledge, food purchasing behaviors, or dietary intake. Settings were defined as school, home, primary care, child care, community/environment, or multiple settings. We assumed that weight is the primary outcome and did query the stakeholders about other primary or clinical outcomes. The number of items that the stakeholders could identify as highest priority varied depending on the category: one highest for each of the demographic categories, two highest for intermediate outcomes, one highest for intervention, and three highest for setting. For each category, they were also asked to specify the one lowest priority. Consensus was defined as a simple majority. Evidence gaps for age, race/ethnicity, socioeconomic status, and interventions that achieved consensus as a high priority were advanced to the round 2. The gaps for which there was consensus as low priority were excluded from subsequent rounds.

Round 2

In the second round, the options for age, race/ethnicity, socioeconomic status, and interventions advanced from round 1 were presented to the stakeholders in the form of sub-questions in an effort to further refine the priorities. Settings that achieved consensus as a high priority in the first round were included in round 2. Options were presented to the stakeholders so that they had to simultaneously select one from each of five categories (age groups, socioeconomic status, race/ethnicity, settings, and targets), using dropdown menus, and identify the combination as a priority combination. The stakeholders could select five combinations as priorities.

Round 3

In the final round of assessment, the stakeholders were presented with research questions that we developed based on their prioritization of the refined evidence gaps within each category and their selection of combinations of individual populations, interventions, and settings in round 2. We phrased their refined priority combinations from round 2 as research questions for their review. The stakeholders were asked to rate the value in addressing each research question developed as a result of feedback from the previous two rounds of assessment. They were asked to consider to what extent having an answer to the question would improve obesity prevention efforts. Using a Likert scale, stakeholders were asked to rate the value of addressing each question from 1-5 where 1 is the lowest value and 5 is the highest value. Their responses were compiled and reported as a mean score for each question to stratify the high-priority research questions.

Results

During round 1, the majority of the six stakeholders suggested that future studies should enroll children from all age groups (2–18 years), from all income strata or selectively enroll children from low income families. They felt that children of all races or ethnicities will be important to study. Four of six stakeholders regarded a combination of interventions as the priority for future rather than interventions focusing solely on diet or physical activity/sedentary behavior. During round 1, multiple setting or home-based interventions were voted as highest priority by five of six stakeholders.

When the stakeholders were asked in round 2 to select and prioritize combinations consisting of a specified age group, income group, ethnic group, and setting; the stakeholders favored studies of toddlers and young children over adolescents, favored studies of caloric restriction over physical activity interventions, and favored studies conducted at home or in a community setting over studies conducted in schools (where the evidence is sufficient). Given these preferences, we presented the stakeholders with comparative effectiveness questions which they prioritized in round 3. The 12 questions in order of preference are in Table B. The stakeholders prioritized several methodological challenges that we presented to them with the recommendation that these should be addressed in future studies. These included the need for better evaluation of community-based studies, attention to barriers and facilitators of implementation, and improved analytic methods.

Table B. Prioritized research questions

Research Question
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention versus NO INTERVENTION targeting caloric intake to prevent weight gain?
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?

Each of the study questions described above would best be answered with a randomized control trial (RCT). Depending on the question, recruitment may be from physicians' offices or public services offices and implementation might be at churches or community centers or may require the involvement of individuals who can make home visits. The interventions that involve the community may benefit from a community-based participatory research framework, and randomization might be at the level of the community. Those interventions targeting Hispanic youngsters will require culturally-appropriate interventions and the availability of Spanish language materials if needed. Scalability will depend on intensity of intervention.

Discussion

Using the 2012 draft evidence report “Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis,”⁷ we identified and prioritized Future Research Needs. We identified 12 research questions considered to be of potential health impact by a multidisciplinary group of stakeholders. We expect that this report will help researchers to develop studies evaluating the Key Questions identified, as well as enable funding agencies to dedicate their resources to areas most likely to make a health impact.

Our stakeholders were clear on prioritizing certain groups of the population for further study: the stakeholders favor future research about obesity prevention in toddlers and young children, particularly low income toddlers and children, with attention to Hispanic youngsters. Although the stakeholders acknowledge that additional research is needed for prevention of obesity in adolescents as well, they prioritize research directed at younger children. Similarly, they acknowledge that obesity strikes middle and upper income children and yet recommend that attention be first directed to low income children. Given that the sites of recruitment and the optimal interventions may differ for low income children relative to middle and upper income children, studying this population separately may indeed be necessary.

Our stakeholders greatly favored studying interventions that target caloric restriction over other targeted behaviors. This is not because the evidence already strongly supports or refutes the use of physical activity interventions, but the stakeholders were wary of the efficacy of these interventions particularly for toddlers and young children. They suggested that the settings in which the intervention targeting calorie restriction is delivered is the most pressing question to address: should the intervention be delivered in the home or should it involve a community intervention as well—this community intervention might be as high-level as implementation of legislation regarding food availability (e.g., large soft drinks) or it may be more local such as the implementation of a healthy-eating campaign among local churches. We caution that the interventions must be culturally appropriate for the targeted children, particularly studies that will enroll primarily Hispanic children. The stakeholders do not want to see additional studies conducted in schools at present. They feel that the sufficiency of the evidence makes the other settings greater priorities.

The methodological limitations in the current evidence base should be addressable, and the stakeholders endorsed the methodological challenges that we presented to them. They particularly support the need for improved methods for the evaluation of community based interventions as well as better description (and testing) of barriers and facilitators to implementing proven programs, as well as greater rigor in analyses.

There are some limitations of this project. The large number of evidence gaps made it unfeasible to create and present all research questions from these gaps to our stakeholders, as would be a more standard approach to identifying Future Research Needs. We modified the

approach piloted in a prior Future Research Needs report for this purpose.⁸ This method relied heavily on input from the authors of the Comparative Effectiveness Review and the stakeholders, who all have their own priorities and biases that influence their reflections on the Comparative Effectiveness Review process. Additionally, we had hoped to have more stakeholders involved in this process.

There are several strengths to this report. Our research team included several members of the original report's research team, which provided ready access to their insight on the process of the Comparative Effectiveness Review and challenges experienced by that original team. We also recruited stakeholders to represent a variety of interests. The prevention of childhood obesity is important to not only to clinicians and researchers, but is also of particular interest to parents. We were fortunate to have an engaged parent of an obese child among our stakeholders. We feel that our diverse array of engaged stakeholders helps to ensure that the Key Questions we developed will be of significant public health impact. Finally, we stakeholders were allowed to provide free-text comments in addition to performing rankings. This qualitative component gave insight on thought process behind many of the individual stakeholders' choice.

Conclusions

Using the 2012 draft evidence report "Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis," we identified and prioritized Future Research Needs. We identified 12 research questions considered to be of potential health impact by a multidisciplinary group of stakeholders. These questions focus on high-priority populations, interventions, comparisons, and settings as identified by our stakeholders. During the systematic review process, we identified methodological issues in the literature; our stakeholders agreed that improving these methods will benefit studies to come. This report may inform and support researchers to develop studies to evaluate the Key Questions identified, as well as enable funding agencies to dedicate their resources to areas most likely to make a health impact.

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Background

Context

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Table 1. Key Questions from “Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-analysis”

Number	Question
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KQ 3	What is the comparative effectiveness of primary care-based interventions for the prevention of obesity or overweight in children?
KQ 4	What is the comparative effectiveness of childcare setting-based interventions for the prevention of obesity or overweight in children?
KQ 5	What is the comparative effectiveness of community-based or environment-level interventions for the prevention of obesity or overweight in children?
KQ 6	What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or overweight in children?
KQ 7	What is the comparative effectiveness of multi-setting interventions for the prevention of obesity or overweight in children?

Abbreviation: KQ = Key Question

Identification of Evidence Gaps

The draft Comparative Effectiveness Review evaluated 96 intervention studies reported in 113 articles and yielded the following main conclusions:

- The majority of studies in high income countries are conducted in schools.
- School-based intervention can prevent overweight and obesity, especially those with a home intervention that targets both diet and physical activity.

Though the strength of evidence is moderate to high for school-based interventions, the limited number of studies and insufficient or low strength of evidence to support interventions in other settings made it difficult to conclude that interventions in other settings could effectively prevent childhood obesity. Based on the evidence gaps in these settings, we identified the following as Future Research Needs.

Future research is needed on interventions delivered in settings other than schools or home. Thus, future research is needed for all of the Key Questions except for Key Questions 1 and 2, and especially needed are studies of environmental and policy changes.

While there have been other reviews on the effectiveness of interventions on food and nutrition policies at school on changes in children's diet and school food environments, there are still gaps in the literature on some aspects, such as the impact of regulations on food availability and its impact on obesity prevention. Only a few studies that we reviewed used social marketing to deliver messages on nutrition, physical activity and health. This approach might be integrated with other intervention components to create an atmosphere favorable to healthy and active lifestyles and related behavioral changes. Additionally, further testing of the value of consumer health informatics products for obesity prevention is needed. In addition, there is a lack of evidence on the impact of regional or national policies on childhood obesity prevention, including agriculture policy and regulations on food retailing and distributions.

Furthermore, further research might be conducted with stratified analysis on sub-groups, such as by gender, age, race/ethnicity, or socioeconomic status. This will help learn how different groups may respond differently to the same intervention, and help tailor future interventions to maximize their benefits.

There were methodological limitations of the reviewed studies which suggest that future research might improve upon the methods. Few of the studies we reviewed reported process evaluation, which would provide useful insight regarding why some studies might detect desirable effect of the intervention. More vigorous analytic approaches are desirable in future studies, to better analyze the repeated measures collected during follow-up, to control for confounders, and to test effect modification.

The studies we reviewed typically had limited followup and we could not know the sustainability of these interventions. Future studies need to design innovative approaches that have a high likelihood of sustainability; for example, studies using a community-based participatory approach. This may be designed to take advantage of other existing public health, government or other organization supported programs or try to gain more support and engagement from related key stakeholders.

The objective of this report is to prioritize the needs for research addressing gaps in the existing literature on the effectiveness of childhood obesity prevention programs by engaging expert stakeholders using a modified Delphi method.

Methods

The protocol for developing the evidence gaps into a prioritized list of research needs and feasible researchable questions involved the following steps: identification of evidence gaps; engagement of stakeholders; prioritization of PICOTS elements as Future Research Needs through a modified Delphi process; development of research questions and study design considerations by the research team; and prioritization of research questions through a modified Delphi process.

Identification of Evidence Gaps

To identify evidence gaps, our research team abstracted evidence gaps from the 2012 draft evidence report *Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis*.⁷ The investigators identified evidence gaps based on the strength of evidence, applicability, and limitations of the review. All evidence statements with low or insufficient strength were considered evidence gaps.

Engagement of Stakeholders

We invited previous stakeholders from the Comparative Effectiveness Review, as well as new participants. We recruited a variety of stakeholder perspectives with potential interest in childhood obesity prevention such as parents, researchers, and representatives from government and public agencies. Stakeholders were recruited via email, letter and phone invitations. All participating stakeholders provided copies of their curriculum vitae and disclosure statements to ensure that all potential conflicts of interest were disclosed. The list of stakeholders and their disclosure statements were approved by AHRQ.

Stakeholders received a copy of the Executive Summary from the draft 2012 evidence report *Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis* and were asked to read this in preparation. The stakeholders participated in a three-round prioritization process by responding to our questions via a Web-based assessment tool (SurveyMonkey, Palo Alto, CA; Appendix A). The assessments included multiple choice and dropdown menus. We allowed the respondents to clarify their responses with written comments but these were not considered integral to the process. Stakeholders were compensated for their time.

Criteria for Prioritization

The stakeholders participated in a three-round modified Delphi process during which they prioritized the evidence gaps. Stakeholders were asked to base their responses upon their review of the Executive Summary of the draft evidence report and the evidence gaps described in that document. We did not otherwise impose any criteria for how they should prioritize the elements Rounds 1 and 2. During round 3 they were asked to prioritize based on the “potential impact of the results of the question.” We defined consensus as a majority of respondents identifying an element as being among the highest priority or among the lowest priority.

Delphi Round 1: Prioritization of Populations, Interventions, Intermediate Outcomes, and Settings. Stakeholders were asked to rate the highest priority populations, and the highest and lowest priority interventions and settings for future research in childhood obesity prevention.

Populations were defined on the basis of age (all ages, toddlers, young children, adolescents), race/ethnicity (all races/ethnicities, Black, Hispanic, Native American, white), and socioeconomic status (all income levels, low, middle, high). Interventions were defined as dietary, physical activity, or both. Intermediate outcomes were defined as nutrition knowledge, food purchasing behaviors, or dietary intake. Settings were defined as school, home, primary care, child care, community/environment, or multiple settings. We assumed that weight is the primary outcome and did query the stakeholders about other primary or clinical outcomes. Due to variation in the number of evidence gaps across categories, the number of items that the stakeholders could identify as highest priority varied depending on the category: one highest for each of the demographic categories, one highest for intervention, and three highest for setting. For each category, they were also asked to specify the one lowest priority.

In this round, we also asked the stakeholders to comment on methodological limitations in the literature which we reviewed for the systematic review. We asked the stakeholders to consider aspects of study design and reporting that should be included in future research.

They were asked to select the *three* highest priority methodological issues that should be addressed in future research, from those below:

- Use of standardized definitions for overweight and obesity
- Use of more rigorous analytic approaches
- Masking of outcome assessor to study group assignment
- Improved methods for evaluation of community-based interventions
- Greater fidelity to study intervention
- Description of barriers and facilitators
- Consideration scalability of the intervention at the time of study design
- Assessment and reporting on adverse effects of the intervention

Delphi Round 2: Rating of Combinations of Populations, Interventions, and Settings. Based on the results of the first round, a second assessment was prepared. Evidence gaps for age, race/ethnicity, socioeconomic status, and intervention that achieved consensus as a high priority by a simple majority were included as sub-questions for refinement in this round of assessment. Settings that achieved consensus as a high priority for future research were included in round 2 in the form they were presented in round 1. The settings that achieved consensus as a low priority were excluded from subsequent rounds. Because combination interventions achieved the overwhelming support of the stakeholders in round 1, physical activity was advanced to the second round as it could not be reliably excluded. In this round, the stakeholders were asked to select *combinations* of populations, settings, and interventions (see Table 2). For each combination, stakeholders were allowed to select one age group, one race/ethnicity group, one socioeconomic status group, one setting, and one intervention.

Table 2. Options for Delphi Round 2

Age	Race/Ethnicity	Socioeconomic Status	Setting	Target
Young	Black	Low income	Clinic	Caloric intake
Toddler	Hispanic	Middle income	Community	Physical activity
Adolescent	Native American		Home	Diet composition
	White			Sleep

The options were presented to the stakeholders so that they had to select one from each category (age, race/ethnicity, socioeconomic status, setting, and target), using dropdown menus,

and identify the combination as a priority combination. The stakeholders were asked to select *five* combinations as priorities. An example may be: a *home*-based study of *caloric intake* modification for *low-income Black toddlers*.

Delphi Round 3: Rating of Research Questions. In round 3, we presented the stakeholders with a list of research questions that our team generated based on their feedback in Rounds 1 and 2. The team phrased the questions as high-priority interventions compared with no intervention, (rather than compared with another active intervention). The questions about settings were phrased as high-priority settings compared with other high-priority settings. The stakeholders rated each question on a Likert scale from 1 to 5 to indicate the value of addressing each question in future research. They were asked to consider to what extent having an answer to the question would improve obesity prevention efforts. Their responses were compiled and reported as a mean score for each question.

Research Design Considerations

Our team took the list of prioritized questions and considered the aspects of study design⁸ and conduct that would best answer the research question. These were not discussed with the stakeholders as they were not uniformly experts in research methodology.

Research in Progress

Clinical research repositories and research-related sites including ClinicalTrials.gov, NIH Reporter, the Canadian Institutes of Health Research, the World Health Organization International Clinical Trials Registry Platform Search Portal, and the European Union Clinical Trials Register were searched to identify ongoing or recently completed studies related to childhood obesity prevention. Appendix B details the search strategies used for each repository.

Results

Identified gaps for childhood obesity prevention were listed by population (Table 3), intervention (Table 4) and setting (Table 5). Results from the stakeholder prioritization are presented as below.

Populations of High Interest

During round 1, the majority of the six stakeholders suggested that future studies should enroll children from all age groups (2–18 years), from all income strata or selectively enroll children from low income families. They felt that children of all races or ethnicities would be important to study (see Table 3).

Table 3. Round 1 stakeholder votes for highest priority population of children for future research

Age Groups	Votes (N=6)
Toddler (2–5)	2
Childhood (6–12)	1
Adolescence (13–18)	0
All children (2–18)	3*
Socioeconomic Groups	Votes (N=6)
High income	0
Middle income	0
Low income	3*
All income groups	3*
Racial/Ethnic Groups	Round 1 (N=6)
Asian/Pacific Islander	0
Black	0
Hispanic	1
Native American	0
White	0
All race/ethnicity groups	5*

*Indicates prioritized research need.

Intervention Targets

During round 1, four of six stakeholders regarded a combination of interventions as the priority for future rather than interventions focusing solely on diet or physical activity/sedentary behavior (see Table 4).

Table 4. Round 1 stakeholder votes for interventions for future research

Targets	Highest Priority	Lowest Priority
	Votes (N=6)	Votes (N=6)
Diet	1	0
Physical Activity\Sedentary Behavior	0	5
Combination of Interventions	4*	1
Other	1	None stated

*Indicates prioritized research need.

Settings of Intervention

During round 1, multiple setting or home was voted as highest priority by five of six stakeholders (see Table 5). The stakeholders did not favor additional studies in schools.

Table 5. Round 1 stakeholder votes for settings for future research

Settings	Highest Priority	Lowest Priority
	Votes (N=6)	Votes (N=6)
School	2	4
Home	5*	0
Primary Care	1	0
Child Care	2	1
Community or Environment	3*	1
Multiple Setting	5*	Not asked

*Indicates prioritized research need.

Upon selection of combinations of specific populations, and individual targets, interventions, and settings by stakeholders in round 2, other patterns emerged. The stakeholders consistently favored prioritizing school-aged children (6 to 12 year-olds); they also favored low income groups for further study and Hispanic children.

When the stakeholders were asked to specify the target of intervention during round 2, they favored future research about the impact of *caloric restriction* as opposed to dietary composition. Physical activity interventions were not a favored strategy for future research. Similarly, when asked to specify the highest priority settings of interest, the stakeholders selected *the home setting* as the priority setting for future research, followed by the *community setting*. The results from round 2 allowed us to generate the research questions that were presented to the stakeholders in round 3. They are shown below along with the mean Likert rating from the stakeholders, which reflect the value placed on these questions to address research needs about childhood obesity prevention (see Table 6).

Table 6. Stakeholder rating of the value in addressing each research question

Research Question	Mean Rating*
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	3.8
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	3.8
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	3.8
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention versus NO INTERVENTION targeting caloric intake to prevent weight gain?	3.6
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	3.6
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	3.4
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	3.4

Table 6. Stakeholder rating of the value in addressing each research question (continued)

Research Question	Mean Rating*
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?	3.2
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	3.2
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?	3.0
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?	2.8
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?	2.4

*1 is the lowest value and 5 is the highest value.

Methodological Needs in the Body of Evidence

When the stakeholders were presented with methodological gaps which the team identified as prevalent in this body of literature, they responded by stating their three highest priority methodological issues that should be address in future research. They are ordered by the number of votes by the stakeholders (with each contributing three votes; see Table 7).

Table 7. Stakeholder rating of high-priority methodological gaps which should be addressed in future research studies of childhood obesity prevention (from round 1)

Methodological Gaps	Votes
Improved methods for evaluation of community-based interventions	4
Description of barriers and facilitators to implementing programs	3
More rigorous analytic approaches (i.e., to better analyze the repeated measures collected during the follow-up)	3
Consideration of scalability of the intervention at the time of study design	2
Greater fidelity to study intervention	2
Use of standardized definitions for overweight and obesity	2
Assessment and reporting on adverse effects of the intervention	0
Masking of outcome assessor to study group assignment	0

Research Questions and Research Design Considerations

The optimal research design and other research considerations are presented in Table 8.

Table 8. High priority research questions and research design considerations for each question

Research Question	Research Design Considerations
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	Best answered with RCT, recruitment might be at physicians' offices or through public assistance offices, may require home visits to assure fidelity to intervention, scalability will depend on intensity of intervention
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	Best answered with RCT, recruitment might be through physician offices or schools, may require home visits to assure fidelity to intervention, scalability will depend on intensity of intervention
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	Best answered with RCT, recruitment and implementation might be at churches or community centers, may benefit from a community-based participatory research framework, scalability will depend on intensity of intervention, randomization might be at level of community
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention versus NO INTERVENTION targeting caloric intake to prevent weight gain?	Best answered with RCT, recruitment and implementation might be at churches or community centers, may benefit from a community-based participatory research framework, scalability will depend on intensity of intervention, randomization might be at level of community
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	Best answered with RCT, recruitment might be at physicians' offices or through public assistance offices, may require home visits to assure fidelity to intervention, scalability will depend on intensity of intervention, will require a culturally-appropriate intervention and availability of Spanish language materials if needed
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	Best answered with RCT, recruitment and implementation might be at churches or community centers, may benefit from a community-based participatory research framework, scalability will depend on intensity of intervention, randomization might be at level of community, will require a culturally-appropriate intervention and availability of Spanish language materials if needed
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	Best answered with RCT, recruitment and implementation might be at churches or community centers, may benefit from a community-based participatory research framework, scalability will depend on intensity of intervention, randomization might be at level of community, will require a culturally-appropriate intervention and availability of Spanish language materials if needed

Table 8. High priority research questions and research design considerations for each question (continued)

Research Question	Research Design Considerations
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?	Best answered with RCT, recruitment and implementation might be at churches or community centers, may benefit from a community-based participatory research framework, scalability will depend on intensity of intervention, randomization might be at level of community
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based intervention targeting caloric intake versus NO INTERVENTION to prevent weight gain?	Best answered with RCT, recruitment might be at physicians' offices or schools, may require home visits to assure fidelity to intervention, scalability will depend on intensity of intervention, randomization might be at level of community, will require a culturally-appropriate intervention and availability of Spanish language materials if needed
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?	Best answered with RCT, recruitment and implementation might be at churches or community centers, may benefit from a community-based participatory research framework, scalability will depend on intensity of intervention, randomization might be at level of community, randomization might be at level of community, will require a culturally-appropriate intervention and availability of Spanish language materials if needed
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?	Best answered with RCT, recruitment may be from public services offices or physicians' offices and implementation might be at churches or community centers, may benefit from a community-based participatory research framework, scalability will depend on intensity of intervention, randomization might be at level of community, randomization might be at level of community, will require a culturally-appropriate intervention and availability of Spanish language materials if needed
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME-based versus HOME + COMMUNITY-based intervention targeting caloric intake to prevent weight gain?	Best answered with RCT, recruitment may be from public services offices or physicians' offices and implementation might be at churches or community centers, may benefit from a community-based participatory research framework, scalability will depend on intensity of intervention, randomization might be at level of community, randomization might be at level of community, will require a culturally-appropriate intervention and availability of Spanish language materials if needed

Abbreviation: RCT = randomized controlled trial

All of the above designs should carefully track participants and aim for high participant retention; these studies are still at the point of requiring demonstration of the efficacy of the intervention. At the point of expanding the intervention for broader implementation, questions about the effectiveness can be addressed. These may include questions about the feasibility of implementation in different communities, the feasibility of local clinicians or educators assuming the roles of the study staff, and the acceptance of the intervention by the targeted population. The community-based interventions should aim to follow the same children across time rather than doing serial cross-sectional studies which are a weaker design. All studies should report BMI-z

score rather than just BMI. Studies should pre-specify their analytic plan regarding multiple measures over time.

Research in Progress

Upon review of five clinical study repositories (Appendix B), we found 12 potentially relevant ongoing studies to address the gaps in the literature regarding obesity prevention in children (Appendix C). Six studies have a combination of targets including behavior, nutrition, and physical activity, four studies target behavioral modifications, one study targets changes in nutrition only, and one study targets changes physical activity only.

Discussion

Using the 2012 draft evidence report “Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis,” we identified and prioritized Future Research Needs. We identified 12 research questions considered to be of potential health impact by a multidisciplinary group of stakeholders. We believe that this report will help researchers to develop studies evaluating the Key Questions identified, as well as enable funding agencies to dedicate their resources to areas most likely to make a health impact.

Our stakeholders were clear on prioritizing certain groups of the population for further study: the stakeholders favor future research about obesity prevention in toddlers and young children, particularly low income toddlers and children, with attention to Hispanic youngsters. Although the stakeholders acknowledge that additional research is needed for prevention of obesity in adolescents as well, they prioritize research directed at younger children. Similarly, they acknowledge that obesity strikes middle and upper income children and yet recommend that attention be first directed to low income children. Given that the sites of recruitment and the optimal interventions may differ for low income children relative to middle and upper income children, studying this population separately makes sense.

Our stakeholders greatly favored studying interventions that target caloric restriction over other targeted behaviors. This is not because the evidence already strongly supports or refutes the use of physical activity interventions, but the stakeholders were wary of the efficacy of these interventions particularly for toddlers and young children. They suggested that the settings in which the intervention targeting calorie restriction is delivered is the most pressing question to address: should the intervention be delivered in the home or should it involve a community intervention as well. This community intervention might be as high level as implementation of legislation regarding food availability (e.g., large soft drinks) or it may be more local such as the implementation of a healthy-eating campaign among local churches. We caution that the interventions must be culturally appropriate for the targeted children, particularly studies that will enroll primarily Hispanic children. The stakeholders do not want to see additional studies conducted in schools at present. They feel that the sufficiency of the evidence makes the other settings greater priorities.

The methodological limitations in the current evidence base should be addressable, and the stakeholders endorsed the methodological challenges that we presented to them. They particularly support the need for improved methods for the evaluation of community based interventions as well as better description (and testing) of barriers and facilitators to implementing proven programs, as well as greater rigor in analyses.

There are some limitations of this project. The large number of evidence gaps made it unfeasible to create and present all research questions from these gaps to our stakeholders, as would be a more standard approach to identifying Future Research Needs. We modified the approach piloted in a prior Future Research Needs report for this purpose.⁹ This method relied heavily on input from the authors of the Comparative Effectiveness Review and the stakeholders, who all have their own priorities and biases that influence their reflections on the Comparative Effectiveness Review process. Additionally, we had hoped to have more stakeholders involved in this process.

There are several strengths to this report. Our research team included several members of the original report’s research team, which provided ready access to their insight on the process of the Comparative Effectiveness Review and challenges experienced by that original team. We also recruited stakeholders to represent a variety of interests. The prevention of childhood obesity is

important to not only to clinicians and researchers, but is also of particular interest to parents. We were fortunate to have an engaged parent of an obese child among our stakeholders. We feel that our diverse array of engaged stakeholders helps to ensure that the Key Questions we developed will be of significant public health impact. Finally, we encouraged stakeholders to provide comments in addition to performing rankings. This qualitative component gave important insight on thought process behind many of the stakeholders' choice, and added an additional element of richness to the data we collected.

Conclusion

Using the 2012 draft evidence report “Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and Meta-Analysis,” we identified and prioritized Future Research Needs. We identified 12 research questions considered to be of potential health impact by a multidisciplinary group of stakeholders. These questions focus on high-priority populations, interventions, comparisons, and settings as identified by our stakeholders. During the systematic review process, we identified methodological issues in the literature; our stakeholders agreed that improving these methods will benefit studies to come. This report may inform and support researchers to develop studies to evaluate the Key Questions identified, as well as enable funding agencies to dedicate their resources to areas most likely to make a health impact.

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Abbreviations

AHRQ	Agency for Healthcare Research and Quality
BMI	Body mass index
EPC	Evidence-based Practice Center
RCT	Randomized controlled trial
U.S.	United States

Appendix A. Data Collection Tool Sent to Stakeholders

Child Weight FRN (Round 1)

Exit this survey



Thank you providing us with your feedback. The Johns Hopkins University Evidence-based Practice Center is assessing Future Research Needs for evidence about interventions that can help prevent childhood obesity.

Before completing the survey, please read the executive summary of the Comparative Effectiveness Review of Childhood Obesity Prevention Programs (attached in the email). Your expertise on priority areas for future research is extremely important. We will specifically ask you questions about future research needs related to study settings, interventions, outcomes and methodologies. We estimate that this will take 10-15 minutes to complete this assessment.

If there are any questions or problems, please contact Brandyn Lau at blau2@jhmi.edu.

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*** 1. Your name**

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*** 2. Please select the THREE highest priority SETTINGS for future research on childhood obesity prevention.**

- ☐ School
- ☐ Home
- ☐ Primary Care
- ☐ Child Care
- ☐ Community or Environment
- ☐ Multiple Setting

Multiple Settings, please specify (e.g. school + home or community + consumer health informatics)

3. Please provide a brief explanation for your selections.

*** 4. Please select the ONE lowest priority SETTING for future research on childhood obesity prevention.**

- ☐ School
- ☐ Home
- ☐ Primary Care
- ☐ Child Care
- ☐ Community or Environment

5. Please provide a brief explanation for your selection.

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*** 6. What is the highest priority target for future research on childhood obesity prevention?**

- ☐ Diet
- ☐ Physical Activity / Sedentary Behavior
- ☐ Combination (i.e. Diet and Physical Activity)
- ☐ Other (please specify)

Other (please specify)

7. Please provide a brief explanation for your selection.

*** 8. What is the lowest priority target for future research on childhood obesity prevention?**

- ☐ Diet
- ☐ Physical Activity / Sedentary Behavior
- ☐ Combination Interventions (i.e. Diet + Physical Activity)

9. Please provide a brief explanation for your selection.

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*** 10. Do you think it is important for future research to study on other behaviors other than caloric intake, physical activity and sedentary behavior?**

- ☐ No
- ☐ Yes

If Yes, please explain



*** 11. Please select up to TWO highest priority INTERMEDIATE OUTCOMES for future research in childhood obesity prevention.**

- ☐ Nutrition knowledge, attitudes, and beliefs (child and caregivers)
- ☐ Food purchasing behaviors (child and caregivers)
- ☐ Dietary intake (energy, nutrients, foods)
- ☐ Food access
- ☐ Other (please specify)

Other(s) (please specify)

67%

*** 12. Please select the highest priority age group for future research in childhood obesity prevention.**

- ☐ Toddler (age 2-5 years)
- ☐ Childhood (age 6-12 years)
- ☐ Adolescence (age 13-18 years)
- ☐ All Children (age 2-18 years)

13. Please provide a brief explanation for your selection.

*** 14. Please select the highest priority socioeconomic group for future research in childhood obesity prevention.**

- ☐ High income
- ☐ Middle income
- ☐ Low income
- ☐ All income groups

15. Please provide a brief explanation for your selection.

*** 16. Please select the highest priority race/ethnicity group for future research in childhood obesity prevention.**

- ☐ Asian/Pacific Islander
- ☐ Black
- ☐ Hispanic
- ☐ Native American
- ☐ White
- ☐ All race/ethnicity groups

17. Please provide a brief explanation for your selection.

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Child Weight FRN (Round 1)

Exit this survey



Several limitations regarding many previous intervention studies and our suggestions for future research in the field were described in the discussion of the Executive Summary of the Comparative Effectiveness Review of Childhood Obesity Prevention Programs.

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*** 18. In our review of the Comparative Effectiveness Review of Childhood Obesity Prevention Programs, we identified several limitations in the published literature. They are listed below. Please select the 3 highest priority methodological needs for future studies on childhood obesity prevention.**

- ☐ Use of standardized definitions for overweight and obesity
- ☐ Use more rigorous analytic approaches (i.e. to better analyze the repeated measures collected during the follow-up)
- ☐ Making of outcome assessor to study group assignment
- ☐ Improved methods for evaluation of community-based interventions
- ☐ Greater fidelity to study intervention
- ☐ Description of barriers and facilitators
- ☐ Consideration of scalability of the intervention at the time of study design
- ☐ Assessment and report on adverse effects of the intervention
- ☐ Other (please specify)

If Other, please specify

19. Please provide a brief explanation for your selections.

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Child Weight FRN (Round 1)

[Exit this survey](#)

20. Is there anything that you would like to add?

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Child Weight FRN (Round 2)

Thank you providing us with your feedback. Based on feedback provided in the first round of assessment, we will ask you questions about future research needs related to subgroup populations and interventions of highest priority for future research. We estimate that this will take 10 minutes to complete this assessment.

If you have any questions or problems, please contact Brandyn Lau at blau2@jhmi.edu.

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Child Weight FRN (Round 2)

1. Your name

Name:

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Child Weight FRN (Round 2)

2. If future studies were developed to focus on children of specific age groups, please select the HIGHEST PRIORITY age group for future research for obesity prevention in children.

- ☐ Toddler (age 2-5)
- ☐ Young children (age 6-12)
- ☐ Adolescent (age 13-18)

3. Which subgroup population is a higher priority for future research of obesity prevention in children?

- ☐ Low income
- ☐ Racial/ethnic minority

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Child Weight FRN (Round 2)

4. Please select the HIGHEST PRIORITY age-income subgroup populations for future research on obesity prevention in children.

	Toddlers	Young children	Adolescents
Low income	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Middle income	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Please select the HIGHEST PRIORITY age-race subgroup population for future research on obesity prevention in children.

	Toddlers	Young children	Adolescents
Asian/Pacific Islander	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Black	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hispanic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Native American	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
White	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Please select the HIGHEST PRIORITY race-income subgroup population for future research on obesity prevention in children.

	Low income	Middle income
Asian/Pacific Islander	<input type="radio"/>	<input type="radio"/>
Black	<input type="radio"/>	<input type="radio"/>
Hispanic	<input type="radio"/>	<input type="radio"/>
Native American	<input type="radio"/>	<input type="radio"/>
White	<input type="radio"/>	<input type="radio"/>

*** 7. Please select the FIVE HIGHEST PRIORITY AGE-RACE-SOCIOECONOMIC subgroup populations, SETTING, and TARGET for future research on obesity prevention in children (where #1 is the highest priority).**

	Age	Race/Ethnicity	Socioeconomic Status	Setting	Target
#1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
#2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
#3					

	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
#4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
#5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

8. Please provide a brief explanation for your selections.

9. Please select the LOWEST PRIORITY AGE-RACE-SOCIOECONOMIC subgroup populations, SETTING, and TARGET for future research on obesity prevention in children.

	Age	Race/Ethnicity	Socioeconomic Status	Setting	Target
#1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

10. Please provide a brief explanation for your selection.

Child Weight FRN (Round 2)

4. Please select the HIGHEST PRIORITY age-income subgroup populations for future research on obesity prevention in children.

	Toddlers	Young children	Adolescents
Low income	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Middle income	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Please select the HIGHEST PRIORITY age-race subgroup population for future research on obesity prevention in children.

	Toddlers	Young children	Adolescents
Asian/Pacific Islander	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Black	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hispanic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Native American	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
White	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Please select the HIGHEST PRIORITY race-income subgroup population for future research on obesity prevention in children.

	Low income	Middle income
Asian/Pacific Islander	<input type="radio"/>	<input type="radio"/>
Black	<input type="radio"/>	<input type="radio"/>
Hispanic	<input type="radio"/>	<input type="radio"/>
Native American	<input type="radio"/>	<input type="radio"/>
White	<input type="radio"/>	<input type="radio"/>

! This question requires 5 high priority population selections.

*** 7. Please select the FIVE HIGHEST PRIORITY AGE-RACE-SOCIOECONOMIC subgroup populations, SETTING, and TARGET for future research on obesity prevention in children (where #1 is the highest priority).**

	Age	Race/Ethnicity	Socioeconomic Status	Setting	Target
#1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
#2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

#3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
#4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
#5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

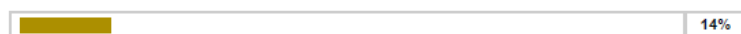
8. Please provide a brief explanation for your selections.

9. Please select the **LOWEST PRIORITY AGE-RACE-SOCIOECONOMIC** subgroup populations, **SETTING**, and **TARGET** for future research on obesity prevention in children.

	Age	Race/Ethnicity	Socioeconomic Status	Setting	Target
#1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

10. Please provide a brief explanation for your selection.

Child Weight FRN (Round 3)



Thank you providing us with your feedback. Based on feedback provided in the first two rounds of assessment, we have developed several high priority questions for future research. In this final round of assessment, we will ask you to rate the value of addressing each research question. We estimate that this will take 5 minutes to complete this assessment.

If you have any questions or problems, please contact Brandyn Lau at blau2@jhmi.edu.

Child Weight FRN (Round 3)



* 1. Your name

Name:

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Next

Child Weight FRN (Round 3)



On the following page, we will ask you to rate a set of questions for future research developed from your previous feedback regarding the comparative effectiveness of interventions intended to modify caloric intake conducted in different settings that focus on different population groups.

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Child Weight FRN (Round 3)

57%

2. Please rate each of these questions based on the potential impact of the results of these questions – 1 is high and 5 is low.

	1	2	3	4	5
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based versus HOME-based interventions targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME-based versus NO INTERVENTION interventions targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based interventions versus NO INTERVENTION targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based versus HOME-based interventions targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based versus NO INTERVENTION interventions targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based interventions versus NO INTERVENTION targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based versus HOME-based interventions targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME-based versus NO INTERVENTION interventions targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME HISPANIC TODDLERS, what is the comparative effectiveness of a HOME + COMMUNITY-based interventions versus NO INTERVENTION targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based versus HOME-based interventions targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME-based versus NO INTERVENTION interventions targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Among LOW-INCOME HISPANIC YOUNG CHILDREN, what is the comparative effectiveness of a HOME + COMMUNITY-based interventions versus NO INTERVENTION targeting caloric intake to prevent weight gain?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Child Weight FRN (Round 3)



**3. Within the field of obesity prevention in children, what types of research would you like to see?
(Please describe your ideal population, intervention, and setting)**

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Child Weight FRN (Round 3)



**4. Regarding your experience participating in this project, is there anything that you would
change to improve the process?**

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Appendix B. Search Strategies for Potentially Relevant Ongoing Studies

Resource URL	Search Parameters	Search Terms/Strategy
ClinicalTrials.gov http://clinicaltrials.gov/	Advanced search, Conditions field used	Prevent child obesity OR Prevent child overweight OR Prevent child weight gain Open Studies Exclude Unknown
EU Clinical Trials Register https://www.clinicaltrialsregister.eu/	Not applicable	Prevent child obesity OR Prevent child overweight OR Prevent child weight gain
NIH Reporter http://projectreporter.nih.gov/reporter.cfm	Projects field searched	Prevent child obesity OR Prevent child overweight OR Prevent child weight gain
Canadian Institutes of Health Research http://www.cihr-irsc.gc.ca/	Funding Decisions Data field searched	Prevent child obesity OR Prevent child overweight OR Prevent child weight gain
World Health Organization International Clinical Trials Registry Platform Search Portal http://apps.who.int/trialsearch/	Searched Condition field, Recruitment status = ALL	Prevent child obesity OR Prevent child overweight OR Prevent child weight gain

Appendix C. Potentially Relevant Ongoing or Recently Completed Studies

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
<p>Title: Addressing Health Literacy and Numeracy to Prevent Childhood Obesity (GreenLight)</p> <p>Identifier(s): NCT01040897</p>	<p>Start date: December 2009</p> <p>Estimated study completion date: December 2013</p> <p>Estimated primary completion date: June 2013 (Final data collection date for primary outcome measure)</p>	<p>Purpose: To assess the efficacy of a low-literacy/numeracy-oriented intervention aimed at teaching pediatric resident physicians to promote healthy family lifestyles and prevent overweight among young children and their families in under-resourced communities.</p> <p>Study design: Allocation: Randomized Endpoint Classification: Efficacy Study Intervention Model: Single Group Assignment Masking: Open Label Primary Purpose: Prevention</p> <p>Condition(s): Obesity Prevention</p> <p>Intervention(s): Behavioral: Health Communication and Obesity Prevention Behavioral: Injury Prevention Arm</p> <p>Estimated enrollment: 1,240</p>	<p>Vanderbilt University, Eunice Kennedy Shriver National Institute of Child Health and Human Development, University of Miami, University of North Carolina, Chapel Hill, New York University</p>	<p>ClinicalTrials.gov http://clinicaltrials.gov/ct2/show/NCT01040897</p>

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: Reducing Television Viewing to Prevent Obesity in Hispanic Preschool Children Identifier(s): NCT01216306	Start date: October 2010 Estimated study completion date: August 2013 Estimated primary completion date: June 2013 (Final data collection date for primary outcome measure)	Purpose: To conduct a pilot group randomized controlled trial evaluating the effectiveness of the adapted curriculum to reduce TV viewing and excess weight gain in low income, Hispanic preschool children Study design: Allocation: Randomized Endpoint Classification: Efficacy Study Intervention Model: Parallel Assignment Masking: Open Label Primary Purpose: Prevention Condition(s): Obesity Intervention(s): Behavioral: Television reduction curriculum Estimated enrollment: 120	Baylor College of Medicine	ClinicalTrials.gov http://clinicaltrials.gov/ct2/show/NCT01216306

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: The Feeding Dynamic Intervention: Self-Regulation of Intake in Preschoolers (FeeDIn) Identifier(s): NCT01515254	Start date: February 2012 Estimated study completion date: July 2014 Estimated primary completion date: February 2013 (Final data collection date for primary outcome measure)	Purpose: To examine the Feeding Dynamic Intervention as a tool to prevent obesity in young children. The purpose of the intervention is to improving caregiver feeding practices, child eating behaviors, and child self-regulation of energy intake in the short term. Study design: Allocation: Randomized Intervention Model: Parallel Assignment Masking: Single Blind (Outcomes Assessor) Primary Purpose: Treatment Condition(s): Children Exogenous Obesity Eating Behavior Intervention(s): Behavioral: lifestyle counseling, parental feeding Behavioral: No Intervention: control group Estimated enrollment: 84	Nationwide Children's Hospital, National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)	ClinicalTrials.gov http://clinicaltrials.gov/ct2/show/NCT01515254

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: Childhood Obesity Prevention Identifier(s): NCT01539070	Start date: March 2012 Estimated study completion date: May 2013 Estimated primary completion date: November 2012 (Final data collection date for primary outcome measure)	Purpose: The purpose of this study is to develop, implement and evaluate an intervention focused to change feeding practices and patterns of physical activity of preschool children through providing motivational counseling to the mother. Study design: Allocation: Randomized Endpoint Classification: Efficacy Study Intervention Model: Parallel Assignment Masking: Open Label Primary Purpose: Prevention Condition(s): Childhood Obesity Intervention(s): Behavioral: Eating and physical activity counseling Estimated enrollment: 200	Coordinación de Investigación en Salud, Mexico, Hospital Infantil de Mexico Federico Gomez, Harvard Pilgrim Health Care John E. Fogarty International Center, Inter-American Development Bank, Instituto Nacional de Salud Publica, Mexico, University of Guelph	ClinicalTrials.gov http://clinicaltrials.gov/ct2/show/NCT01539070

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: NET-Works: Community Preschooler Obesity Prevention Identifier(s): NCT01606891	Start date: June 2012 Estimated study completion date: December 2016 Estimated primary completion date: December 2016 (Final data collection date for primary outcome measure)	Purpose: To evaluate the effects of a three-year multi-setting parent-targeted randomized controlled intervention on the primary outcome, child BMI, compared with a standard primary care-only intervention among 500 low income ethnic minority two to four year old children who are at or above the 50th percentile of BMI for age and gender. Study design: Allocation: Randomized Endpoint Classification: Efficacy Study Intervention Model: Factorial Assignment Masking: Open Label Condition(s): Childhood Obesity Intervention(s): Behavioral: multi-component/setting parent-targeted intervention Estimated enrollment: 500	University of Minnesota - Clinical and Translational Science Institute	ClinicalTrials.gov http://clinicaltrials.gov/ct2/show/NCT01606891

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: An Interactive Web-based Intervention to Achieve Healthy Weight in Young Children Identifier(s): NCT01552642	Start date: June 2012 Estimated study completion date: August 2013 Estimated primary completion date: August 2013 (Final data collection date for primary outcome measure)	Purpose: To develop and implement an effective intervention program designed to prevent and treat obesity in young children. Study design: Allocation: Randomized Endpoint Classification: Efficacy Study Intervention Model: Parallel Assignment Masking: Open Label Primary Purpose: Treatment Condition(s): Child Obesity Overweight Intervention(s): Behavioral: face-to-face meetings Behavioral: Standard of care Estimated enrollment: 156	University of Wisconsin, Madison	ClinicalTrials.gov http://clinicaltrials.gov/ct2/show/NCT01552642

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: Healthy Home Offerings Via the Mealtime Environment (HOME) Plus Identifier(s): NCT01538615	Start date: July 2010 Estimated study completion date: June 2015 Estimated primary completion date: June 2014 (Final data collection date for primary outcome measure)	Purpose: The goal of the proposed project is to see if an innovative family-based intervention can reduce childhood obesity by actively engaging the whole family in promoting healthy behaviors in the home. Study design: Allocation: Randomized Endpoint Classification: Efficacy Study Intervention Model: Parallel Assignment Masking: Open Label Primary Purpose: Prevention Condition(s): Obesity Intervention(s): Behavioral: HOME Plus intervention Estimated enrollment: 380	University of Minnesota - Clinical and Translational Science Institute, NIDDK	ClinicalTrials.gov http://clinicaltrials.gov/ct2/show/NCT01538615

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: Food, Fun, & Fitness Internet Program for Girls: Outcome Evaluation Identifier(s): NCT01481948	Start date: January 2012 Estimated study completion date: June 2015 Estimated primary completion date: June 2015 (Final data collection date for primary outcome measure)	Purpose: The purpose of this project is to reduce health disparities in obesity risk among 8-10 year old African American girls using a culturally sensitive and developmentally appropriate internet-based program with no face-to-face interaction. Study design: Allocation: Randomized Endpoint Classification: Efficacy Study Intervention Model: Parallel Assignment Masking: Open Label Primary Purpose: Prevention Condition(s): Obesity Intervention(s): Behavioral: Food, Fun, & Fitness Internet Program for Girls Estimated enrollment: 800	Baylor College of Medicine National Center on Minority Health and Health Disparities	ClinicalTrials.gov http://clinicaltrials.gov/ct2/show/NCT01481948

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: HEALTHY CHILDREN, STRONG FAMILIES: AMERICAN INDIAN COMMUNITIES PREVENTING OBESITY Identifier(s): 1R01HL114912-01	Start date: 1-AUG-2012 Estimated study completion date: 31-JUL-2017	Purpose: The proposed study will use community-based participatory research methods to enhance the intervention and then conduct a 2-arm staggered-enrollment randomized trial of Healthy children, Strong Families (HCSF) versus control (child safety intervention) in a 2-year design in 6 diverse rural and urban AI communities nationally. Study design: Randomized trial Condition(s): Obesity Intervention(s): HCSF Estimated enrollment: Not reported	University of Wisconsin-Madison	NIH Reporter http://projectreporter.nih.gov/project_info_description.cfm?aid=8344016&icde=13963266
Title: GROWING RIGHT ONTO WELLNESS (GROW): CHANGING EARLY CHILDHOOD BMI TRAJECTORIES Identifier(s): 5U01HL103620-03	Start date: 20-AUG-2010 Estimated study completion date: 30-APR-2017	Purpose: To evaluate an intervention intended to Prevent obesity in preschoolers in an approach that affects multiple levels of risk and is both family-based and community centered. Study design: RCT Condition(s): Obesity Intervention(s): Diet and Physical activity curriculum Estimated enrollment: 600	Vanderbilt University	NIH Reporter http://projectreporter.nih.gov/project_info_details.cfm?aid=8305496&icde=13963266

Title/Identifier(s)	Study Dates	Description	Sponsor OR Principal Investigator Collaborator(s)	Source
Title: CHALLENGE IN SCHOOLS: ADOLESCENT OVERWEIGHT PREVENTION Identifier(s): 5R01HD054727-05	Start date: 20-JUN-2008 Estimated study completion date: 31-MAR-2013	Purpose: To develop and implement a multilevel small group and school-wide intervention to Prevent overweight among adolescent females by increasing consumption of healthy foods (fruits and vegetables) and time spent in physical activity. Study design: Randomized trial Condition(s): Pediatric overweight Intervention(s): The Challenge Program, which is based on developmental-ecological and social cognitive theory Estimated enrollment: 800	University of Maryland, Baltimore	NIH Reporter http://projectreporter.nih.gov/project_info_details.cfm?aid=8255546&icde=13963266
Title: EFFICACY OF OPTIMAL LEVELS OF DIETARY DAIRY ON MODULATION OF ADOLESCENT WEIGHT Identifier(s): 5R01NR010108-05	Start date: 1-APR-2008 Estimated study completion date: 31-MAR-2013	Purpose: To determine if increasing intake of dairy foods to recommended levels in adolescent females with habitually low calcium intake will decrease body fat gain compared with similar females who continue their low calcium intake. Study design: RCT Condition(s): Obesity Intervention(s): Dairy foods Estimated enrollment: 321	Creighton University	NIH Reporter http://projectreporter.nih.gov/project_info_details.cfm?aid=8247000&icde=13963266

Abbreviations: BMI = body mass index; HCSF = Healthy children, Strong Families; HOME = Healthy Home Offerings Via the Mealtime Environment; NIDDK = National Institute of Diabetes and Digestive and Kidney Diseases; NIH = National Institutes of Health; PI = principal investigator; RCT = randomized controlled trial.