



# Effective Health Care Program

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Comparative Effectiveness Review  
Number 115

## **Childhood Obesity Prevention Programs: Comparative Effectiveness Review and Meta-Analysis**



Agency for Healthcare Research and Quality  
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# *Comparative Effectiveness Review*

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Number 115

## **Childhood Obesity Prevention Programs: Comparative Effectiveness Review and Meta-Analysis**

**Prepared for:**

Agency for Healthcare Research and Quality  
U.S. Department of Health and Human Services  
540 Gaither Road  
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**Prepared by:**

Johns Hopkins University Evidence-based Practice Center  
Baltimore, MD

**Investigators:**

Youfa Wang, M.D., Ph.D.  
Yang Wu, M.S.  
Renee F. Wilson, M.S.  
Sara Bleich, Ph.D.  
Larry Cheskin, M.D.  
Christine Weston, Ph.D.  
Nakiya Showell, M.D., M.P.H.  
Oluwakemi Fawole, M.D., M.P.H.  
Brandyn Lau, M.P.H.  
Jodi Segal, M.D., M.P.H.

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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 health care in the United States. These reviews provide comprehensive, science-based information on common, costly medical conditions, and new health care 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).

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We welcome 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, 540 Gaither Road, Rockville, MD 20850, or by email to [epc@ahrq.hhs.gov](mailto:epc@ahrq.hhs.gov).

Carolyn M. Clancy, M.D.  
Director  
Agency for Healthcare Research and Quality

Stephanie Chang, M.D., M.P.H.  
Director, EPC Program  
Center for Outcomes and Evidence  
Agency for Healthcare Research and Quality

Jean Slutsky, P.A., M.S.P.H.  
Director, Center for Outcomes and Evidence  
Agency for Healthcare Research and Quality

Christine Chang, M.D., M.P.H.  
Task Order Officer  
Center for Outcomes and Evidence  
Agency for Healthcare Research and Quality



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## Key Informants

In designing the study questions, the EPC consulted several Key Informants who represent the end-users of research. The EPC sought the Key Informant input on the priority areas for research and synthesis. Key Informants are not involved in the analysis of the evidence or the writing of the report. Therefore, in the end, study questions, design, methodological approaches, and/or conclusions do not necessarily represent the views of individual Key Informants.

Key Informants must disclose any financial conflicts of interest greater than \$10,000 and any other relevant business or professional conflicts of interest. Because of their role as end-users, individuals with potential conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any conflicts of interest.

The list of Key Informants who participated in developing this report follows:

Benjamin Caballero, M.D., Ph.D.  
Johns Hopkins University  
School of Public Health  
Baltimore, MD

Allison Field, Sc.D.  
Harvard University  
Department of Pediatrics  
Boston, MA

Jean-Pierre Chanione, M.D., Ph.D.  
Department of Pediatrics  
University of British Columbia  
Vancouver, BC, Canada

Stacey Passaro, M.Eng.  
Passaro Engineering  
Baltimore, MD

Cheryl DePinto, M.D., M.P.H.  
Department of Health and Mental Hygiene  
Baltimore, MD

Joanne Spahn, M.S., R.D.  
Nutrition Evidence Analysis Library  
U.S. Department of Agriculture  
Washington, DC

William Dietz, M.D., Ph.D.  
Director of the Division of Nutrition,  
Physical Activity, and Obesity  
Centers for Disease Control and Prevention  
Atlanta, GA

## 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 \$10,000 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.

The list of Technical Experts who participated in developing this report follows:

Benjamin Caballero, M.D., Ph.D.  
Johns Hopkins University  
School of Public Health  
Baltimore, MD

Anne Scheimann, M.D., M.B.A.  
Johns Hopkins University  
School of Medicine  
Baltimore, MD

William Dietz, M.D., Ph.D.  
Director of the Division of Nutrition,  
Physical Activity, and Obesity  
Centers for Disease Control and Prevention  
Atlanta, GA

Joanne Spahn, M.S., R.D.  
Nutrition Evidence Analysis Library  
U.S. Department of Agriculture  
Washington, DC

Shiriki Kumanyika, Ph.D., M.P.H.  
University of Pennsylvania  
School of Medicine  
Philadelphia, PA

Susan Yanovski, M.D.  
National Institute of Diabetes and Digestive  
and Kidney Disorders  
Bethesda, MD

## Peer Reviewers

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 does not necessarily represent the views of individual reviewers.

Peer Reviewers must disclose any financial conflicts of interest greater than \$10,000 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.

The list of Peer Reviewers follows:

Laurie Anderson, Ph.D., M.P.H.  
Centers for Disease Control and Prevention  
Scientific Information and Dissemination  
Branch  
Atlanta, GA

David Katz, M.D., M.P.H.  
Yale University  
School of Medicine  
Derby, CT

Tim Lobstein, Ph.D.  
Director of Policy and Programmes  
IASO – The International Association for  
the Study of Obesity  
London, United Kingdom

Kristine Madsen, M.D.  
University of California, San Francisco  
School of Medicine  
San Francisco, CA

Joshua Sharfstein, M.D.  
Secretary, Maryland Department of Health  
and Mental Hygiene  
Baltimore, MD

Susan Woolford, M.D., M.P.H.  
University of Michigan  
Department of Pediatrics and  
Communicable Diseases  
Ann Arbor, MI

# Childhood Obesity Prevention Programs: Comparative Effectiveness Review and Meta-Analysis

## Structured Abstract

**Objectives.** Childhood obesity is a serious health problem in the United States and worldwide. More than 30 percent of American children and adolescents are overweight or obese. We assessed the effectiveness of childhood obesity prevention programs by reviewing all interventional studies that aimed to improve diet, physical activity, or both and that were conducted in schools, homes, primary care clinics, childcare settings, the community, or combinations of these settings in high-income countries. We also reviewed consumer health informatics interventions. We compared the effects of the interventions on weight-related outcomes (e.g., body mass index [BMI], waist circumference, percent body fat, skinfold thickness, prevalence of obesity and overweight); intermediate outcomes (e.g., diet, physical activity); and obesity-related clinical outcomes (e.g., blood pressure, blood lipids).

**Data sources.** We searched MEDLINE<sup>®</sup>, Embase<sup>®</sup>, PsycInfo<sup>®</sup>, CINAHL<sup>®</sup>, clinicaltrials.gov, and the Cochrane Library through August 11, 2012.

**Methods.** Two reviewers independently reviewed each article for eligibility. For each study, one reviewer extracted the data and a second reviewer verified the accuracy. Both reviewers assessed the risk of bias for each study. Together, the reviewers graded the strength of the evidence (SOE) supporting interventions—diet, physical activity, or both—in each setting for the outcomes of interest. We quantitatively pooled the results of studies that were sufficiently similar. Only experimental studies with followup of at least 1 year (6 months for studies in school settings) were included. We abstracted data on comparisons of intervention versus control.

**Results.** We identified 34,545 unique citations and included 131 articles describing 124 interventional studies. The majority of the interventions (104 studies) were school based, although many of them included components delivered in other settings. Most were conducted in the United States and in the past decade. Results of four studies were pooled for BMI and four for BMI z-score in the school-only setting; results of five school-home studies were pooled for BMI. Other studies tested interventions delivered at home (n=6), in primary care (n=1), in childcare (n=4), and in the community (n=9). Six studies tested consumer health informatics interventions. For obesity prevention, the following settings and interventions showed benefit: school-based—diet or physical activity interventions (SOE moderate); school-based with a home component—physical activity interventions (SOE high) and both diet and physical activity (SOE moderate); school-based with home and community components—diet and physical activity interventions (SOE high); school-based with a community component—diet and physical activity interventions (SOE moderate); community with a school component—diet and physical activity interventions (SOE moderate). The strength of the evidence is either low or insufficient for the remainder of the interventions and settings.

**Conclusions.** The evidence is moderate about the effectiveness of school-based interventions for childhood obesity prevention. Physical activity interventions in a school-based setting with a family component or diet and physical activity interventions in a school-based setting with home

and community components have the most evidence for effectiveness. More research is needed to test interventions in other settings, such as those testing policy, environmental, and consumer health informatics strategies.

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# Executive Summary

## Background

The epidemic of childhood obesity is threatening America's children.<sup>1-3</sup> Overweight children and adolescents are at greater risk for health problems compared with their normal-weight counterparts and are more likely to become obese adults.<sup>4</sup> Obese children and adolescents are more likely to have serious health conditions, such as cardiovascular, metabolic, and psychosocial illnesses; type 2 diabetes; hypertension; high cholesterol; stroke; heart disease; nonalcoholic fatty liver disease; certain cancers; and arthritis. Other reported health consequences of childhood obesity include eating disorders and mental health issues, such as depression and low self-esteem.

Childhood obesity is highly prevalent in the United States.<sup>5</sup> Data from the 2007–08 National Health and Nutrition Examination Survey indicate that 17 percent of U.S. children and adolescents (ages 2–19 years) were obese, and approximately 30 percent were either overweight or obese.<sup>2</sup> Some minority groups, such as African-Americans, Hispanics, and Native Americans, and low-income groups are at higher risk of obesity.<sup>1</sup> Obesity is the result of biological, behavioral, social, environmental, and economic factors and the complex interactions among these factors that promote a positive energy balance. At present, the way that these factors contribute to the disparities in obesity prevalence among population groups in the United States is poorly understood. Nevertheless, a growing body of research suggests that many factors interact, including individual factors, home influences, the school environment, factors in the local community, and policies implemented at the regional and national level. They can contribute to obesogenic environments and affect children's weight.<sup>6</sup> A number of leading health organizations and expert panels, including the World Health Organization<sup>7</sup> and an Institute of Medicine expert panel, have recommended comprehensive interventions to fight the growing obesity epidemic.<sup>8,9</sup>

For this review, we differentiate between prevention, often called “intervention” in the childhood obesity research field, and treatment, also called “weight management” or “weight loss.” The main goal of most childhood obesity prevention programs is to prevent nonoverweight children from becoming overweight or obese, while the primary objective of obesity treatment programs is for pediatric patients to lose weight. Programs designed for obesity prevention may also help overweight or obese children lose or stabilize their weight. The present review focuses on prevention. A recent Agency for Healthcare Research and Quality (AHRQ) report<sup>10</sup> reviewed the targeted treatment of overweight or obese children, so we did not address that topic in this review.

## Types of Interventions

This report focuses on childhood obesity prevention studies, which are aimed at preventing children from gaining excessive body weight and reducing their risk of developing obesity. Unlike weight-loss interventions for obese or overweight children, these interventions may not have a goal of helping children lose weight. However, prevention studies often include all children in a population, and therefore include obese and overweight children.

Interventions to prevent obesity in children largely aim to modify diet, physical activity, or sedentary activity. Because the interventions vary substantially depending on the setting, we have organized this report first by the primary setting where the interventions took place (e.g.,

school, home) and then by the interventions within that setting. This should facilitate use of the report, as it is expected that decisionmakers are best able to implement interventions in the settings over which they have control (e.g., schools). We focus in this report on the comparative effectiveness of interventions; thus, outcomes need to be compared between two groups, each of which received an intervention, or between two groups, one of which received usual care or no intervention.

## **School-Based Interventions**

These interventions took place primarily in schools, although they might also have involved parents and/or community or home activities (e.g., homework, students bringing home fliers).

## **Home-Based Interventions**

These took place in the child's home (e.g., interventions to alter the foods purchased for home use, family fitness).

## **Primary Care-Based Interventions**

These took place in the offices of a primary care practitioner, a clinic, or other health care entity delivering primary health care to children. We classified primary care-based interventions that included a health informatics component under primary-care interventions. Note that we classified any school-based health care as a school-based intervention.

## **Childcare-Based Interventions**

These were interventions in settings where children received nonparental/noncustodial care, generally outside the home. We classified interventions delivered in school-based aftercare programs as school-based interventions. We classified childcare interventions delivered in other settings as childcare-based interventions.

## **Community-Based and Environment-Level Interventions**

These included interventions delivered by enforcement of policies or legislation, or by changes to the built environment. Additionally, these interventions involved interaction with the community (a group of individuals that existed prior to the intervention and that shared one or more common characteristics, such as the YMCA or church groups).<sup>11</sup> Note that we classified school-based policies with the school-based interventions.

## **Consumer Health Informatics-Based Interventions**

Consumer health informatics (CHI) are technologies that deliver interventions and information indirectly (as opposed to in person) to patients or individuals in the community. These interventions might include Web-based, phone-based, and video-based programs, games, and information storehouses.

## **Scope of the Review**

We compared the effectiveness of obesity prevention programs for children and adolescents conducted in the United States and other high-income countries.

We reviewed all studies of children that tested interventions of diet, physical activity, or any combination of these in any setting or combinations of settings (e.g., school, home, primary care,

childcare, CHI) over at least 1 year, with the exception of school-based studies or studies in other settings with a school component, which required only 6 months.

We compared the effects of the interventions on outcomes related to weight or body composition (e.g., body mass index [BMI], weight, BMI-z score [measure of relative weight adjusted for age and sex], waist circumference, percent body fat, skinfold thickness, prevalence of obesity or overweight); clinical outcomes related to obesity (e.g., blood pressure, blood lipids); behavioral outcomes related to energy balance (e.g., dietary intake, physical activity, sedentary behaviors); and adverse effects of interventions (Table A and Figure A).

## Key Questions

The Key Questions (KQs) are as follows:

**Key Question 1.** What is the comparative effectiveness of school-based interventions for the prevention of obesity or overweight in children?

**Key Question 2.** What is the comparative effectiveness of home-based interventions for the prevention of obesity or overweight in children?

**Key Question 3.** What is the comparative effectiveness of primary care–based interventions for the prevention of obesity or overweight in children?

**Key Question 4.** What is the comparative effectiveness of childcare setting–based interventions for the prevention of obesity or overweight in children?

**Key Question 5.** What is the comparative effectiveness of community-based or environment-level interventions for the prevention of obesity or overweight in children?

**Key Question 6.** What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or overweight in children?

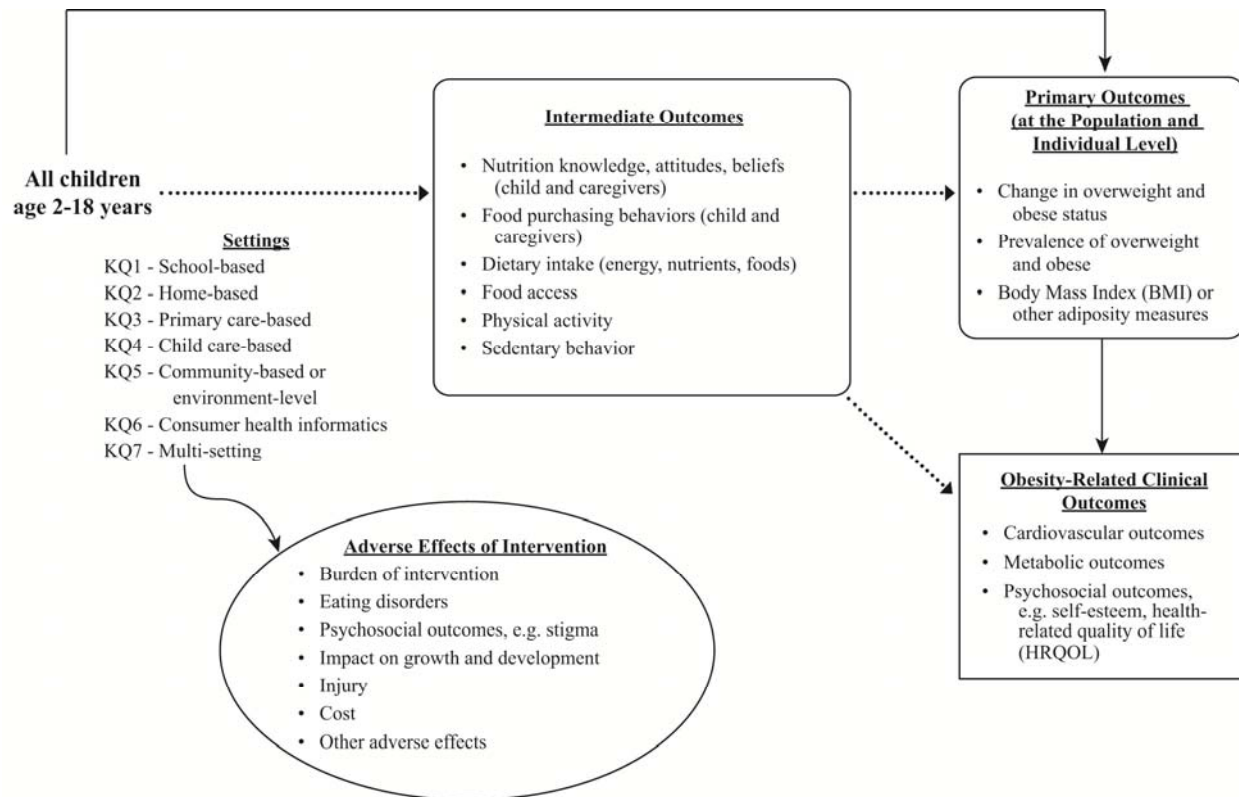
**Key Question 7.** What is the comparative effectiveness of multisetting interventions for the prevention of obesity or overweight in children?

**Table A. Characteristics of the studies according to the PICOTS framework**

<b>PICOTS Elements</b>	<b>Characteristics</b>
<b>Population(s)</b>	All children are in the range of 2–18 years, regardless of BMI classification.
<b>Interventions</b>	<p>KQ1: Diet, physical activity, or combination interventions delivered in schools</p> <ul style="list-style-type: none"> <li>Includes nutrition education, nutrition, diet, healthy eating, parenting styles, education, policy</li> </ul> <p>KQ2: Diet, physical activity, or combination interventions delivered or implemented in the home</p> <ul style="list-style-type: none"> <li>Includes healthy eating education, parenting styles, education</li> </ul> <p>KQ3: Diet, physical activity, or combination interventions delivered or recommended in a primary care setting</p> <ul style="list-style-type: none"> <li>Includes patient, parent, and family counseling; referrals to nutritionists</li> </ul> <p>KQ4: Diet, physical activity, or combination interventions delivered in a childcare setting</p> <ul style="list-style-type: none"> <li>Includes menu changes, physical activity, policy</li> </ul> <p>KQ5: Diet, physical activity, or combination interventions delivered or implemented at the community level or through environmental modification</p> <ul style="list-style-type: none"> <li>Includes physical activity, farmers' markets, community gardens, cooking lessons, policy, green space, food store accessibility, access to healthy food choices</li> </ul> <p>KQ6: Diet, physical activity, or combination interventions delivered with consumer health informatics</p> <ul style="list-style-type: none"> <li>Includes Web-based interventions, cell phone-based interventions</li> </ul> <p>KQ7: Diet, physical activity, or combination interventions delivered across a combination of settings</p>
<b>Comparisons</b>	<p>No intervention</p> <p>Usual care or other interventions by settings</p> <p>Note: We compare the intervention group vs. the control group (i.e., those who did not receive the intervention or received usual care or other interventions) within each study and then across studies within the same setting (e.g., schools, childcare centers).</p>
<b>Outcomes</b>	<p>Primary outcomes</p> <ul style="list-style-type: none"> <li>Weight-related or body composition outcomes, including BMI or BMI distribution in the population, adiposity or other weight measures, and prevalence of obesity or overweight</li> </ul> <p>Intermediate outcomes</p> <ul style="list-style-type: none"> <li>Dietary intake, fruit and vegetable intake, fatty food intake, sugar-sweetened beverage intake, physical activity, sedentary activity</li> </ul> <p>Adverse effects</p> <ul style="list-style-type: none"> <li>Eating disorders, psychosocial outcomes, impact on growth and development, injury, cost</li> </ul> <p>Obesity-related clinical outcomes</p> <ul style="list-style-type: none"> <li>Cardiovascular outcomes, metabolic outcomes</li> </ul>
<b>Timing</b>	Outcome assessment must be at least 6 months from the baseline assessment for KQ1 school-based interventions. Outcome assessment must be at least 1 year from the baseline assessment for KQs 2 through 7 if it does not include school-based interventions. Outcome assessment must be at least 6 months from the baseline assessment for KQs 2 through 7 if the KQ does include school-based interventions.
<b>Setting</b>	Schools, home, primary care clinics, childcare settings, or community organizations; environment-level interventions; consumer health informatics; or across these settings

BMI = body mass index; KQ = Key Question; PICOTS = population(s), interventions, comparisons, outcomes, timing, and setting

**Figure A. Analytic framework for comparative effectiveness of childhood obesity intervention programs**



KQ = Key Question

## Methods

### Topic Refinement and Protocol Review

We developed the KQs with the input of a Key Informant Panel that included experts in childhood nutrition policy, academic clinicians treating obese children, representatives from public school systems, parents of obese children, representatives from professional societies focusing on nutrition and obesity, and AHRQ staff. We recruited a Technical Expert Panel that provided input to the Evidence-based Practice Center during our development of the protocol for the Comparative Effectiveness Review.

### Literature Search Strategy

We searched the following databases for primary studies: MEDLINE<sup>®</sup>, Embase<sup>®</sup>, PsycInfo<sup>®</sup>, CINAHL<sup>®</sup>, and the Cochrane Library through August 11, 2012. We did not add any date limits to the search. We developed a search strategy for MEDLINE<sup>®</sup>, accessed via PubMed<sup>®</sup>, based on medical subject headings (MeSH<sup>®</sup>) terms and text words of key articles that we identified a priori. We reviewed the reference lists of all included articles, relevant review articles, and related systematic reviews to identify articles that the database searches might have missed. We uploaded the articles into DistillerSR (Evidence Partners, Ottawa, Ontario, Canada), a Web-based software package developed for systematic review and data management. We used this

database to track the search results at the levels of title review, abstract review, article inclusion/exclusion, and data abstraction.

We conducted a gray literature search in ClinicalTrials.gov to identify unpublished research that was relevant to our review on July 23, 2012. The search strategies we used were comparable to those we used in the MEDLINE search, and we report them in Appendix B of the full report.

## **Study Selection**

We identified studies conducted in the United States or other high-income countries with a very high Human Development Index<sup>12</sup> that described the comparative effectiveness of interventions to prevent obesity (or “excessive weight gain”) in children and adolescents ages 2 to 18 years. We included only randomized controlled trials (RCTs), quasi-experimental studies, and natural experiments. (We call the latter two types “non-RCTs” in this report.)

Studies were eligible for inclusion if they followed children for at least 1 year after the intervention, or for at least 6 months for school-based intervention studies (given the length of a typical school year in the United States). We also included studies that described results from natural experiments, such as those that described outcomes from a community that had a food policy change compared with another community that did not. We did not include other observational studies, such as cross-sectional or cohort studies. We did not exclude studies based on study sample size (Table A).

Studies identified in the gray literature search had to meet the same inclusion criteria as studies identified in the regular searches.

The studies needed to compare results of an intervention with results from usual care, a different intervention, or no intervention. The interventions of interest were those that involved a modification of diet, a modification of physical activity or sedentary activity, or a combination of these. We required that the study reported on the attained differences between the intervention and control groups in weight-related outcomes, including prevalence of obesity or/and overweight, BMI or BMI distribution in the groups, and other weight and adiposity measures such as waist circumference or body fat.

We excluded studies that targeted only overweight or obese children or adolescents, and similarly excluded studies that targeted children with a chronic medical condition such as diabetes or heart disease. We excluded studies that expressly aimed to induce weight loss in the participants. We did not include studies that collected only qualitative results, such as results from interviews or focus groups. We included only articles published in English but reviewed the abstracts of non-English language articles to assess agreement with the results published in English.

## **Data Extraction**

Two independent reviewers conducted title scans and abstract reviews, and reviewed the full articles to assess eligibility for inclusion for each study. We created standardized forms for data extraction. Each article received a double review by study investigators for data abstraction. The second reviewer confirmed the first reviewer’s data abstraction for completeness and accuracy. Reviewers extracted information on study characteristics, study participants, eligibility criteria, interventions, outcome measures, the method of ascertainment, and the outcomes, including measures of variability where available.

In data extraction, we focused on primary outcomes, including BMI and related measures, such as BMI z-score and percentile, waist circumference, percent body fat, skinfold thickness,



prevalence of obesity and overweight, dietary intake, physical activity, and obesity-related clinical outcomes (e.g., blood pressure and blood lipids). We also extracted behavioral outcomes that we considered to be intermediate outcomes.

Data extraction was similar for the studies we identified during the gray literature search.

## **Quality (Risk-of-Bias) Assessment of Individual Studies**

We used the Downs and Black instrument to assess the risk of bias in the included studies.<sup>13</sup> We categorized the studies as having low, moderate, or high risk of bias. We rated a study as having low risk of bias only when the researchers had done all of the following: stated the objective clearly, described the main outcomes, described the characteristics of the enrolled subjects, described the intervention clearly, described the main findings, randomized the subjects to the intervention group, and concealed the intervention assignment until recruitment was complete. Additionally, the study had to have at least partially described the distributions of potential principal confounders in each treatment group. If one of the above items was not completed or if this was difficult to verify, we considered the study to have at least a moderate risk of bias. If two or more of the above items definitively were not done, we considered the study to have a high risk of bias.

## **Data Synthesis**

For each KQ, we created a set of detailed evidence tables containing all information abstracted from eligible studies. We organized the results for each KQ by grouping the studies first according to the combination of settings where the intervention took place (e.g., a school setting along with a home setting) and then by intervention. We eliminated KQ7 in our reporting of the results because we reported on these multisetting interventions within KQs 1 through 6. Note that we reported the detailed findings of studies that examined CHI for KQ6 under other KQs. Only a summary was provided under KQ6.

We described the interventions based on their focus: (a) the targeted behavior outcomes (e.g., dietary intake or physical activity, sedentary behaviors such as recreational screentime [the time spent in front of an electronic device, including television, video games, email], or both diet and physical activity) and (b) the modality the study used to deliver the intervention (e.g., education, a modification of the environment, or instruction in self-management techniques). We reviewed the studies for outcomes for key subgroups, including outcomes reported by sex, age, or racial group, and reported the results separately by subgroups.

When we had three or more studies that had similar interventions and reported outcomes in comparable settings that were homogeneous, we pooled the primary outcomes (i.e., BMI-related measures) quantitatively (i.e., meta-analysis). We calculated pooled mean differences using a DerSimonian and Laird random-effects model.<sup>14</sup> We could not conduct the analysis for other outcomes due to the lack of enough comparable studies. We conducted all meta-analyses using Stata (Intercooled, version 11, StataCorp, College Station, TX). The results of each meta-analysis contributed to our assessment of the precision of the estimate of the outcome, which we used in grading the strength of evidence. We also assessed the precision of the estimate of the outcome when we could not conduct meta-analysis and used it in grading the strength of evidence.

## Strength of the Body of Evidence

In our results, we reported both the strength of evidence and the magnitude of effect (e.g., the difference in changes in BMI between the intervention and control group), but strength of evidence was the primary focus. Our meta-analysis reported magnitude of effect.

We graded the quantity, quality, and consistency of the best available evidence addressing each of our KQs by adapting an evidence-grading scheme recommended in the AHRQ “Methods Guide for Effectiveness and Comparative Effectiveness Reviews” (Methods Guide).<sup>15</sup> We assigned grades for all weight-related outcomes by setting up a hierarchy of outcomes. Within this hierarchy, each study contributed only one weight-related measure to the grade. The hierarchy is as follows: BMI z-score, BMI, prevalence of obesity and overweight, percent body fat, waist circumference, skinfold thickness. For example, if a study measured BMI z-score and body fat, we graded only BMI z-score. We chose to use this hierarchy because these outcomes are closely correlated and encompass the scope of work. We chose six categories of intermediate outcomes: energy intake (i.e., calories), fruit and vegetable intake, fatty food intake, sugar-sweetened beverage intake, physical activity, and sedentary activity. We did not grade adverse events or clinical outcomes. We considered the four recommended domains: risk of bias, directness of the evidence, consistency across studies, and precision of the pooled estimate or the individual study estimates. We found that few studies reported precision.

We classified evidence pertaining to the KQs into four categories: (1) “high” grade, indicating high confidence that the evidence reflects the true effect, and further research is very unlikely to change our confidence in the estimate of the effect; (2) “moderate” grade, indicating moderate confidence that the evidence reflects the true effect, and further research may change our confidence in the estimate of the effect and may change the estimate; (3) “low” grade, indicating low confidence that the evidence reflects the true effect, and further research is likely to change our confidence in the estimate of the effect and is likely to change the estimate; and (4) “insufficient” grade, indicating that evidence is unavailable, there was only one study and it had moderate to high risk of bias, or a conclusion could not be drawn based on the data. We caution that a high strength-of-evidence grade is not necessarily an indicator of effectiveness; there can be strong evidence that an intervention is ineffective or even strong evidence of no effect.

We applied a grading algorithm to the body of evidence in order to have consistent grading across questions. We discussed the grades with the full group of investigators. We assessed risk of bias as described above. If the majority of studies for a given setting and comparison had the same risk of bias (low, moderate, or high), this was the risk category we assigned to that group.

We considered the body of evidence consistent in direction if 70 percent or more of the studies had an effect in the same direction (i.e., showed desirable effect vs. no desirable effect). We did not require a minimum number of studies to apply this rule; for example, a body of evidence with two positive and one negative study would be graded as inconsistent. We identified all studies as providing direct evidence, since all of the studied interventions would directly affect one of our primary outcomes. We considered a study precise if the results for the given outcome were significant at a p value less than 0.05 or had narrow confidence intervals that excluded the null. If 70 percent or more of the studies that reported statistical significance had significant results, we considered the body of evidence precise. We did not require a minimum number of studies to apply this rule; for example, a body of evidence with two precise and one imprecise study would be graded as imprecise although we recognize that, if the studies had been amenable to pooling, the precision might have increased with pooling.

## **Applicability**

We assessed applicability (called “interpretability” in this report) separately for each question. We were guided by the PICOTS (populations, interventions, comparisons, outcomes, timing, and setting) framework, recommended in the Methods Guide.<sup>16</sup> We assessed whether there were features of the individual studies that limited the applicability of the study’s findings, including whether the intensity of the intervention was such that it was unlikely to be widely implemented or whether the study subjects were atypical in some way.

## **Results**

### **Results of the Literature Search**

The literature search identified 34,545 unique citations. We excluded 28,344 citations during title screening and excluded an additional 5,600 during abstract screening. During article screening, we excluded an additional 470 articles that did not meet one or more of the inclusion criteria. We included 124 interventional studies described in 131 articles (Figure B). (Some studies were described in multiple articles.) Our gray literature search of ClinicalTrials.gov identified 3,186 potentially relevant titles. A title screen excluded 2,826 trials. Of the 342 potentially relevant trials, none met our inclusion criteria.

In total, 104 studies assessed school-based interventions, which might include other settings (KQ1). Six studies addressed home-based interventions (KQ2); one study addressed primary care-based interventions (KQ3); four studies addressed childcare-based interventions (KQ4); and nine studies addressed community-based interventions (KQ5). Several studies addressed CHI interventions (KQ6), but we describe them under other KQs. Most (83) of the 124 studies were RCTs: 69 trials for KQ1, 6 for KQ2, none for KQ3, 3 for KQ4, and 5 for KQ5. Six studies addressed KQ6.

We describe the following weight-related outcomes: BMI, BMI z-score, prevalence of obesity and overweight, waist circumference, skinfold thickness, percent body fat, and adverse events. In the full report, we also describe clinical outcomes (e.g., blood pressure, blood lipids) and intermediate behavioral outcomes (e.g., dietary intake, physical activity).

### **Key Question 1. What is the comparative effectiveness of school-based interventions for the prevention of obesity or overweight in children?**

We describe here the large body of evidence about interventions that occurred entirely in schools and the other large body of evidence regarding interventions that occurred predominantly in schools but required the child’s commitment to activities at home. Additionally, in the full report we describe interventions that occurred in the school but required involvement of the community or informatics support.

### **School Based Only**

The strength of evidence is moderate that school-based diet or physical activity interventions prevent obesity or overweight in children. The strength of evidence is low that school-based combination diet and physical activity interventions prevent obesity or overweight in children (Table B, Appendix F).

Two RCTs, described in three articles, evaluated the effects of diet interventions on weight-related outcomes and showed a decrease in BMI or BMI z-score measures over a period of at

least 1 year. These studies were specifically designed to prevent weight gain, and focused on promoting a healthy diet and reducing the consumption of carbonated drinks.

Fifteen studies reported on the effects of physical activity interventions in school on weight-related outcomes. Physical activity interventions had an impact on BMI, waist circumference in girls, skinfold thickness at 52 weeks, and percent body fat in children. These studies were designed to prevent weight gain, reducing screen-based sedentary behavior time, promoting participation in physical activity, and improving fundamental movement skills among children. One of these physical activity intervention studies that had a significant effect on percent body fat enrolled prepubertal girls, who participated in daily physical education classes led by schoolteachers. Some of the physical activity interventions also had an impact on clinical outcomes (e.g., lowering systolic blood pressure) and intermediate outcomes (e.g., increasing physical activity and reducing sedentary activities). These studies were designed to affect the cardiovascular disease risk profile and promoted daily physical activity in elementary-school children. None of these studies reported on adverse events (harms).

Thirty-seven studies assessed the effect of a combined diet and physical activity intervention on weight-related outcomes. Combination interventions show a low strength of evidence that they are effective at reducing BMI, BMI z-score, prevalence of obesity and overweight, percent body fat, waist circumference, and skinfold thickness. Studies reporting on these outcomes were designed to affect weight gain and included intensive classroom physical activity lessons led by trained teachers, moderate to vigorous physical activity sessions, nutrition education materials, and promoting and providing a healthy diet. The intervention studies with significant impact had a duration of 52 to 156 weeks. Children who followed long-term intervention programs showed significant positive changes in physical performance, whereas children in shorter studies had nonsignificant results. Similarly, the long studies had a significant effect on energy intake, reduced consumption of sweetened beverages, and increased fruit and vegetable intake.

## **School Based With a Home Component**

The strength of the evidence is insufficient that diet interventions within school-based studies with a home component prevent obesity or overweight in children. However, the strength of evidence is high that physical activity interventions within school-based studies with a home component prevent obesity or overweight in children. The strength of evidence is moderate that combined diet and physical activity interventions within school-based studies with a home component prevent obesity or overweight in children (Table B, Appendix F).

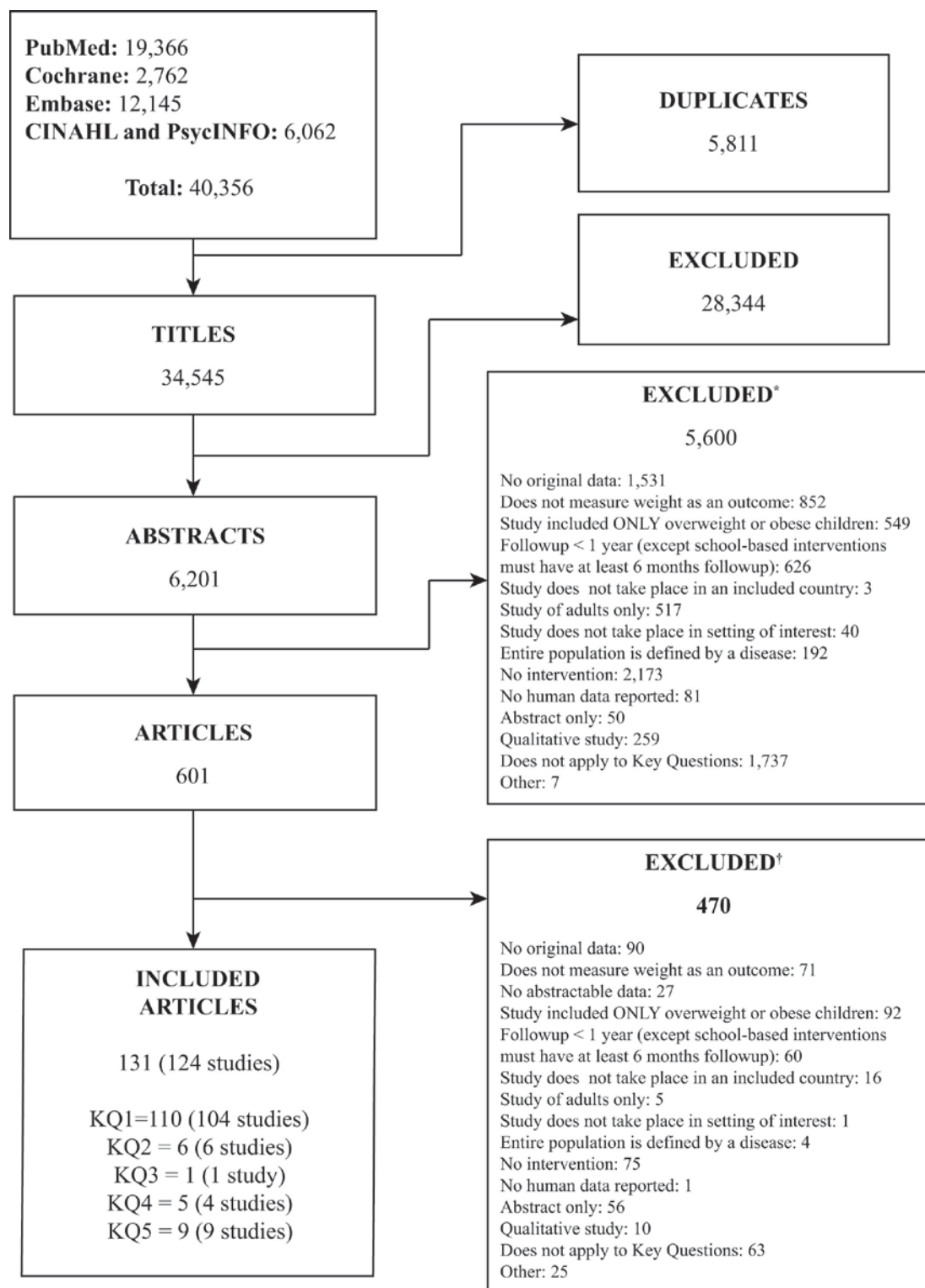
The total number of participants in the 30 studies combined was 28,413. The mean age of participants ranged from 5.8 years to 13.2 years. Only one study tested a diet intervention alone. The more intensive of the two intervention arms showed a reduction in the prevalence of overweight and obese children. Three studies focused exclusively on physical activity interventions. All of them reported statistically significant beneficial effects of the intervention compared with the control group based on the various weight-related outcomes.

Ten (39 percent) of the 26 studies that tested diet and physical activity interventions reported a statistically significant beneficial effect (Table B). Among the 17 studies that measured BMI change, 14 showed a reduction in BMI in the intervention group relative to the control group, with the magnitude of difference ranging from -0.4 to -1.20 kg/m<sup>2</sup>. However, only four of these changes were statistically significant.

The meta-analysis, which included four studies, was not statistically significant ( $p = 0.219$ ). Among the seven studies that measured BMI z-score, two showed significant reductions in favor of the intervention (-0.34 and -0.38) and the rest did not.

Only one study examined and reported a significant desirable intervention effect on the prevalence of overweight and obesity (adjusted odds ratio, 0.67; 95% confidence interval, 0.47 to 0.96;  $p < 0.03$ ). One other study found a significant difference in the prevalence of overweight (3.7%;  $p < 0.05$ ) and obesity (2.3%;  $p < 0.05$ ) in favor of the intervention versus the control.

**Figure B. Results of the literature search**



\*Sum of excluded abstracts exceeds 5,600 because reviewers were not required to agree on reasons for exclusion.

†Sum of excluded abstracts exceeds 470 because reviewers were not required to agree on reasons for exclusion.

## School Based With a Home and Community Component

The strength of evidence is insufficient that school-based physical activity interventions with a home and community component prevent obesity or overweight, as there was only one study and it had a moderate risk of bias. The strength of evidence is high that combined diet and physical activity interventions prevent obesity or overweight, as one study with a low risk of bias and most of the studies with a moderate risk of bias showed a favorable effect (Table B, Appendix F).

Studies on a combination of diet and physical activity interventions generally showed significant improvements in weight outcomes. Most interventions focused on education as well as structural changes to promote a healthful diet and increased physical activity. Many of the interventions did not specifically target obesity prevention.

**Table B. Summary of the strength of evidence for weight-related outcomes in studies taking place in a school setting**

Setting	Intervention Type, Number	Number of Enrolled Participants	Number of Studies With L/M/H RoB	RoB	Consistency	Precision	Directness	SOE
School <sup>a</sup>	D, 2	1,782	0/2/0	Moderate	Consistent	Imprecise	Direct	Moderate
	PA, 15	10,086	0/13/2	Moderate	Consistent	Imprecise	Direct	Moderate
	C, 37	41,875	2/27/8	Low	Inconsistent	Imprecise	Direct	Insufficient
School-home	D, 1	1,321	0/1/0	Moderate	NA	Precise	Direct	Insufficient
	PA, 3	1,654	1/2/0	Moderate	Consistent	Precise	Direct	High
	C, 26	25,438	2/20/4	Moderate	Consistent	Precise	Direct	Moderate
School-home-community	PA, 1	2,829	0/1/0	Moderate	NA	Precise	Direct	Insufficient
	C, 8	11,525	1/4/3	Moderate	Consistent	Imprecise	Direct	High
School-community	D, 1	2,950	0/1/0	Moderate	NA	Precise	Direct	Insufficient
	PA, 1	1,721	0/0/1	High	NA	Imprecise	Direct	Insufficient
	C, 4	3,017	0/2/2	Moderate	Consistent	Imprecise	Direct	Moderate
School-CHI	PA, 2	1,335	0/2/0	Moderate	Inconsistent	Imprecise	Direct	Insufficient
	C, 2	1,896	0/2/0	Moderate	Inconsistent	Imprecise	Direct	Insufficient
School-home-CHI	C, 1	589	0/0/1	High	NA	Imprecise	Direct	Insufficient

C = combination of diet and physical activity interventions; CHI = consumer health informatics; D = diet intervention; H = high; L = low; M = medium; NA = not applicable; PA = physical activity intervention; RoB = risk of bias; SOE = strength of evidence  
<sup>a</sup>Total = 54. One study reported on diet, physical activity, and combination interventions; therefore, it was counted more than once.

## School Based With a Community Component

The strength of evidence is insufficient that a diet approach or an approach combining physical activity with self-management can impact weight outcomes in a community and school setting, as only one study was included for each approach. The strength of evidence is moderate that diet with physical activity impacts BMI or BMI z-score in a community and school setting, as two of the four studies with moderate risk of bias showed a favorable effect.

Out of six studies, the one study on diet intervention showed significant improvements in BMI and prevalence of overweight and obesity.<sup>17</sup> It specifically targeted weight gain prevention.

The intervention focused on education as well as making structural changes to promote active physical activity. Reasons for the significant desirable effect on weight outcomes might be that the intervention specifically targeted weight gain prevention and that the sample size was large (2,950 participants).

One study reported on a physical activity intervention among girls and showed no (or nonsignificant) improvements in weight outcomes over 3 years. The intervention focused on education as well as structural changes to promote healthy diets.

Four studies on a combination of diet with physical activity interventions generally showed nonsignificant improvements in weight outcomes over a period of at least 6 months. The majority of these studies specifically targeted weight gain prevention. The focus of the interventions varied greatly—education, structural changes to promote diet changes and physical activity, or both. One reason for the nonsignificant effect on weight outcomes might have been that the sample sizes were small.

### **School Based With a Consumer Health Informatics Component**

The strength of evidence is insufficient that school-based physical activity interventions with a CHI component prevent obesity or overweight in children. We graded the body of evidence as insufficient because it lacked precision and both studies had a moderate risk of bias. The strength of evidence is insufficient that a combination of diet and physical activity interventions prevent obesity or overweight in children. We graded the body of evidence as insufficient because it lacked precision and included studies with moderate risk of bias (Table B, Appendix F).

Two studies evaluated the effect of a physical activity intervention on weight outcomes. One quasi-experimental study included only female adolescents and the other study randomized adolescents to a control or one of two intervention groups. None of the four identified studies showed a significant intervention effect on weight outcomes.

### **School Based With a Home and Consumer Health Informatics Component**

The strength of evidence is insufficient that school, home, and CHI approaches using combined diet and physical activity interventions prevent obesity or overweight in children. We graded the body of evidence as insufficient because it comprised only a single study with high risk of bias. No studies measured adverse events (Table B, Appendix F).

The one included study did not demonstrate significant beneficial effects on weight outcomes. The use of a non-RCT design and low intervention intensity limited this study.

**Key Question 2. What is the comparative effectiveness of home-based interventions for the prevention of obesity or overweight in children?**

### **Home Based Only**

The strength of evidence is low that home-based combination interventions prevent overweight or obesity in children, and there was insufficient evidence to determine the effect of diet-only intervention in the home (Table C, Appendix F).

We included four home-based intervention studies. One study reported on a diet intervention and the remaining three studies reported on combined diet and physical activity interventions. They all were RCTs. The total followup period ranged from 52 to 104 weeks. The age range of the participants was 3 to 17 years.



None of the four studies detected a statistically significant beneficial intervention effect on BMI or other weight outcomes. However, one study demonstrated a change in the percentage of children who were overweight in favor of one intervention group. One study employed a diet intervention for girls and reported no difference in BMI, fat mass, or weight at 104 weeks between the intervention and control arms. Three combined diet and physical activity intervention trials did not detect a significant beneficial intervention effect on weight outcomes.

## Home Based With a School and Community Component

No conclusions can be made about the effectiveness of a combined diet and physical activity intervention in a home setting with school and community components in prevention of obesity or overweight (Table C, Appendix F). The study we identified reported no significant difference overall in BMI between the control group and a group with combined diet and physical activity intervention.

## Home Based With a Primary Care and Consumer Health Informatics Component

No conclusions can be made about the effectiveness of a combined diet and physical activity intervention in a home setting with primary care and CHI components in prevention of obesity or overweight (Table C, Appendix F). In the single study we identified, there was no difference in BMI z-score between the control group and a group with combined diet and physical activity intervention. This study was small and imprecise.

**Table C. Summary of the strength of evidence for weight-related outcomes in studies taking place in the home**

Setting	Intervention Type, Number	Number of Enrolled Participants	Number of Studies With L/M/H RoB	RoB	Consistency	Precision	Directness	SOE
Home	D, 1	59	0/1/0	Moderate	NA	Imprecise	Direct	Insufficient
	C, 3	262	0/2/1	Moderate	Inconsistent	Imprecise	Direct	Low
Home-PC-CHI	C, 1	878	1/0/0	Low	NA	Imprecise	Direct	Insufficient
Home-school-community	C, 1	1,323	0/0/1	High	NA	Imprecise	Direct	Insufficient

C = combination of diet and physical activity interventions; CHI = consumer health informatics; D = diet intervention; H = high; L = low; M = moderate; NA = not applicable; PC = primary care; RoB = risk of bias; SOE = strength of evidence

## Key Question 3. What is the comparative effectiveness of primary care–based interventions for the prevention of obesity or overweight in children?

No conclusions can be made regarding the effectiveness of a combined diet and physical activity intervention in a primary care setting on obesity or overweight prevention (Table D, Appendix F). The one study in this setting used a quasi-experimental design. The study used educational and physical environmental approaches to target improvements in clinical decision support, counseling of families and patients on behavioral goals, and overall practice and provider management over a 78-week study period. The intervention did not result in decreased prevalence of overweight or obesity.

**Table D. Summary of the strength of evidence for weight-related outcomes in studies taking place in primary care**

Setting	Intervention Type, Number	Number of Enrolled Participants	Number of Studies With L/M/H RoB	RoB	Consistency	Precision	Directness	SOE
Primary care	C, 1	600	0/1/0	Moderate	NA	Imprecise	Direct	Insufficient

C = combination of diet and physical activity interventions; H = high; L = low; M = moderate; NA = not applicable; RoB = risk of bias; SOE = strength of evidence

#### Key Question 4. What is the comparative effectiveness of childcare center-based interventions for the prevention of obesity or overweight in children?

We identified four studies that were reported in five articles. Three RCTs and one non-RCT addressed this question. The non-RCTs tested a physical activity intervention and found significant differences in BMI and percent body fat between intervention and control groups. The remaining studies evaluated the effect of combined diet and physical activity interventions. One of them showed significant differences between intervention and control groups in weight outcomes. No studies reported on adverse events.

We could not make a conclusion about the effectiveness of interventions involving physical activity alone on prevention of obesity and overweight in a childcare setting. The strength of evidence is insufficient that a physical activity intervention in a childcare setting positively affects obesity prevention. Only one study, with a high risk of bias and imprecision, addressed the effect of the intervention on weight outcome. Combined diet and physical activity interventions showed no beneficial effect on childhood obesity and overweight prevention, with a low strength of evidence based on studies with moderate risk of bias and direct, consistent, and imprecise results (Table E, Appendix F).

**Table E. Summary of the strength of evidence for weight-related outcomes in studies taking place in childcare**

Setting	Intervention Type, Number	Number of Enrolled Participants	Number of Studies With L/M/H RoB	RoB	Consistency	Precision	Directness	SOE
Childcare	C, 3	2,393	1/2/0	Moderate	Inconsistent	Imprecise	Direct	Low
	PA, 1	268	0/0/1	High	NA	Precise	Direct	Insufficient

C = combination of diet and physical activity interventions; H = high; L = low; M = moderate; NA = not applicable; PA = physical activity intervention; RoB = risk of bias; SOE = strength of evidence

#### Key Question 5. What is the comparative effectiveness of community-based or environment-level interventions for the prevention of obesity or overweight in children?

The strength of evidence that diet, physical activity, or combinations of these interventions implemented in the community prevent obesity or overweight in children is insufficient. However, the strength of evidence is moderate that a combination of diet and physical activity

interventions, when implemented in the community with some school involvement, prevents obesity or overweight in children (Table F, Appendix F).

We identified nine studies reporting on community-based or environment-level interventions. Three studies took place in the community with school involvement and used a combined diet and physical activity intervention; there was moderate strength of evidence that this setting and intervention impacted childhood obesity prevention. These studies included 4,071 participants. Two were RCTs: one was conducted in the Netherlands and another in the United States. The third was a non-RCT that took place in the United States and enrolled children over 5 years old. Two of the RCTs detected a statistically significant beneficial effect of the intervention compared with the control. No studies reported on adverse events.

**Table F. Summary of the strength of evidence for weight-related outcomes in studies taking place in the community**

Setting	Intervention Type, Number	Number of Enrolled Participants	Number of Studies With L/M/H RoB	RoB	Consistency	Precision	Directness	SOE
Community only	PA, 1	46	0/1/0	Moderate	NA	Imprecise	Direct	Insufficient
Community-school	C, 3	2,966 and children at 24 schools <sup>a</sup>	0/3/0	Moderate	Consistent	Imprecise	Direct	Moderate
Community-school-home	C, 1	1,989	0/2/0	Moderate	NA	Precise	Direct	Insufficient
Community-home	C, 2	564	0/1/1	High	Consistent	Imprecise	Direct	Insufficient
Community-home-PC-CC	C, 1	43,811	0/1/0	Moderate	NA	Precise	Direct	Insufficient
Community-school-PC-CC	C, 1	NR	0/0/1	High	NA	Precise	Direct	Insufficient

C = combination of diet and physical activity interventions; CC = childcare; H = high; L = low; M = moderate; NA = not applicable; NR = not reported; PA = physical activity intervention; PC = primary care; RoB = risk of bias; SOE = strength of evidence

<sup>a</sup>Mean enrollment = 1,109.

## Key Question 6. What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or overweight in children?

We identified six studies meeting our inclusion criteria that evaluated the effects of CHI interventions, but they are reported in other KQs according to their settings.

KQ1 included five studies with a CHI component: four in a school-based setting with a CHI component to the intervention and one in a school-based setting with a home and CHI component. Two of the school-CHI studies reported on physical activity interventions and showed no significant intervention effect on weight outcomes. Two reported on combined diet and physical activity interventions; one showed a significant intervention effect on BMI ( $p < 0.001$ ), while the other failed to show an intervention effect. The study reporting on the school-

home-CHI intervention used a combined diet and physical activity intervention and demonstrated no intervention effect on weight outcomes.

KQ2 included one study with a CHI component. It took place in a home-based setting with primary care and CHI components. This study used a combination diet and physical activity intervention. It showed no difference in BMI z-score between the intervention and control during followup after adjusting for baseline BMI z-score, age, and ethnicity, but it showed significant improvements in sedentary behaviors for both sexes and in active days per week among boys. Subgroup analysis for participants with BMI at or above the 95th percentile showed a desirable but insignificant intervention effect: BMI z-score was  $2.08 \pm 0.02$  for the intervention group and  $2.12 \pm 0.02$  for the control during followup ( $p = 0.10$ ). The intervention did not demonstrate an overall effect on BMI z-scores.

The six CHI intervention studies identified took place only in concert with other interventions, primarily school based, but also home-based physical activity and dietary interventions. CHI interventions contributed to improvements in intermediate outcomes, particularly physical activity, but only one of these six studies, which used a school-based diet and physical activity intervention in concert with a CHI component, demonstrated a change in weight outcomes.

## Discussion

### Key Findings

In total, 124 interventional studies (reported in 131 articles) met our inclusion criteria. The majority (104, 84%) were school-based studies, although many of them also included interventional components implemented in other settings, such as the home or local community. A small number of studies tested interventions primarily implemented in other settings, such as at home, in primary health care, in childcare settings, or in communities.

Based on studies conducted over periods of 6 months to 6 years, the strength of evidence is high that school-based diet and physical activity interventions with a home component or school-based combination interventions with a home and community component prevent obesity or overweight. The strength of evidence is moderate that school-based interventions contribute to obesity prevention. The strength of evidence is moderate that school-based diet or physical activity interventions with either home or community components using a combination intervention contribute to obesity prevention. The evidence is either low or insufficient regarding interventions in other settings due to the small number of published studies, their moderate or high risk of bias, and conflicting results across studies.

Over half of the school-based interventions reported statistically significant beneficial effects of the intervention compared with the control in at least some of the body weight-related measures, such as BMI, BMI z-score, prevalence of overweight and obesity, waist circumference, skinfold thickness, and percent body fat. This typically means a less steep increase over time in the intervention group relative to the control group. Additionally, almost all of the studies that reported results regarding intermediate outcomes detected some statistically significant desirable effects, such as increased vegetable and fruit consumption or increased physical activity. Approximately half of the studies that reported clinical outcomes reported some statistically significant desirable effects, predominantly regarding lowered blood pressure.

## **Applicability**

The results of this review are primarily applicable to children in high-income countries. Results are not necessarily applicable to children in middle- and low-income countries where obesity is increasing. The participants were diverse across studies, with a mix of girls and boys of multiple ethnic groups; however, only a small number of studies reported outcomes by subgroups defined by sex, race, or age. Therefore, one should apply the results cautiously to subgroups of children, particularly subgroups underrepresented in these studies. This includes very young children and selected ethnic groups, as few studies addressed these populations. The results of RCTs are often better than non-RCT results. These results address obesity prevention, not treatment.

## **Implications for Clinical and Policy Decisionmaking**

The findings of this review can help researchers, clinical and public health practitioners, and policymakers decide on appropriate intervention strategies to combat the prevailing obesity epidemic in developed countries, and they help provide insight for future research. We need more research to test interventions that are not school based and those with innovative study design and intervention approaches. The promising results suggest that school-based childhood obesity prevention programs may help fight the rise in childhood obesity. After careful review of the individual components of the successful studies, health care professionals should be able to replicate the results in new settings, which could lead to broad implementation.

## **Limitations**

The review was limited in scope, focusing only on prevention of obesity.

There are many differences across studies in term of settings, design, sample size and characteristics, intervention approaches, primary measures used and reported to assess the intervention effects, length of followup, and statistical analysis approaches. Such variability made it challenging to make cross-comparisons.

Given that we identified so few studies outside of the school setting, we could conduct meta-analysis only for KQ1, and we could include only a small number of interventional studies in the analysis.

We stratified the findings first based on their study settings and then by the intervention (diet, physical activity, or both). However, due to the limited sample size, we could not conduct further stratifications to explore the comparative effectiveness of the specific intervention approaches (e.g., compare educational interventions to environmental changes with pooled analyses) or the specific intermediate outcomes (e.g., compare fruit and vegetable intake to total energy intake). The reported weight outcomes and statistical methods we used to evaluate the intervention effects were heterogeneous across studies. We used BMI or related measures, such as BMI z-score, BMI percentile, and prevalence of overweight and obesity based on BMI cutpoints, as the primary outcomes, but BMI has its limitations as an indirect measure of adiposity, and it is not an ideal indicator for cardiometabolic risks. In addition, studies use different BMI cutpoints to define overweight and obesity.

Another challenge was that some studies assessed the intervention effect by comparing changes in the outcomes between the intervention and control groups, some compared between-group difference in weight outcomes only at followup, some reported on odds ratios of being

overweight/obese, and others reported on the between-group difference in continuous outcome measures such as BMI. This too made comparing or pooling results challenging.

For school-based studies, we reduced the requirement for length of followup to 6 months, considering the usual length of school years. However, 6 months may be too short a time to observe the intervention effect on weight outcomes. Some studies did not state that their original goals were obesity prevention but rather stated that they aimed to reduce cardiovascular risk. We included these in the review because they included diet and physical activity interventions and reported results regarding body weight-related outcomes; thus they could shed light on the effect of childhood obesity interventions. These studies may differ from those that were primarily designed to target childhood obesity prevention. We also note that studies had variable analytic approaches and that not all accounted for correlations between individual students within classrooms. We did not differentiate those studies that did or did not address this clustering.

We attempted to identify non-English studies, but none of those we reviewed met our inclusion criteria. We limited our review to studies conducted only in high-income countries, as these results are more applicable to a U.S. population.

## **Future Research Needs**

Many questions remain unanswered. We have identified a number of evidence gaps, many of which may warrant future research.

### **1. Intervention Studies Conducted in Nonschool Settings**

The literature is sparse on interventions that take place in settings other than schools. We need more studies that test environment- and policy-based interventions. Although environment is a critical area for obesity prevention,<sup>9</sup> very few studies have tested such interventions. In addition, there is scant evidence on the impact of regional or national policies on childhood obesity prevention, including agriculture policies and regulations on food retailing and distribution.<sup>9</sup>

Very few studies took place in clinical settings such as primary care. Primary health care providers could play an important role in childhood obesity prevention and treatment by providing healthful eating and exercise guidelines, and regularly monitoring body weight. Studies might also be designed to compare outcomes of interventions delivered in school with comparable interventions delivered at home or in other settings.

### **2. Innovative Study Design and Intervention Approaches**

Using well-developed behavioral theories when designing interventions may help researchers increase study success. For example, only a few studies used social marketing to deliver messages on nutrition, physical activity, and health. Studies can integrate this approach with other intervention components to promote desirable lifestyle changes. In addition, CHI may provide promise for health promotion programs such as obesity prevention. However, only six studies used CHI and only one of these significantly reduced obesity risk.

### **3. Intervention Studies Guided by Systems Science**

Obesity in children is the result of a complex mix of biological, behavioral, social, economic, and environmental factors. Thus, the effective and sustainable prevention of obesity in children may have to target many factors, which calls for a systems approach to study design, implementation, and evaluation that takes into account multiple risk factors and the complex

interactions and feedback loops among them.<sup>18</sup> To fill in the gaps, researchers first need to understand the contexts and challenges associated with implementing prevention programs in different settings. For example, to conduct a childhood obesity prevention program in a community setting, researchers often need to work with the local community and its key stakeholders, which usually requires considerable effort and resources. Such demand may help explain the small number of intervention studies conducted in nonschool settings. Researchers should report these contextual factors to help decisionmakers get a better idea of the applicability of a specific intervention program to their own community.

#### **4. Studies That Test the Potential Differential Effect of Interventions**

We need research that generates information about important subgroups—such as populations stratified by sex, age, race/ethnicity, or socioeconomic status—to test whether different groups respond differently to the same intervention and help tailor future interventions to maximize their benefits. To allow for such analysis we may need larger studies, which will be more costly. However, they are essential to provide valuable information for disseminating successful interventions. Such studies will test whether different groups respond to the same intervention differently and can help tailor future interventions to maximize their benefits.

Most of the studies we reviewed did not report results by population subgroup. Subgroup analysis is necessary, as the effect size of a specific intervention may be small due to the heterogeneity of intervention effects among different subgroups. For example, an intervention may have worked in girls but not in boys. This may result in overall effectiveness being insignificant. We might conduct further research that includes a stratified analysis of subgroups by sex, age, race/ethnicity, or socioeconomic status. This will help test how different groups may respond to the same intervention, and help tailor future interventions to maximize their benefits. In addition, studies have found that obesity in older children is more predictive of obesity during adulthood than obesity in younger children is.<sup>19</sup> We need more studies to find effective prevention strategies for obesity that occurs in late childhood and adolescence.

#### **5. Studies With High Statistical Power**

We need more studies with large sample sizes and adequate length of followup. Most childhood obesity intervention programs are not intensive enough and result in only modest behavioral changes, perhaps because many factors can affect individuals' eating and physical activity.

#### **6. Publication of Process Evaluation Results on Interventions**

The publication of process evaluation results on interventions, especially those that attempt to compare multiple intervention options, should be encouraged. Such knowledge is important for translational research and dissemination. Very few of the studies we reviewed reported process evaluation, which would provide useful insights regarding why some studies might detect a desirable effect of an intervention, while others do not. We should encourage future studies to consider study design, data collection, final analysis, and publication.

#### **7. Application of Rigorous Analytic Approaches**

We need more rigorous analytic approaches to better analyze the repeated measures collected during followup, to control for confounders remaining after randomization, and to test effect modification and heterogeneity in the treatment effect. Future studies should consider process

evaluation in study design, data collection, final analysis, and publication. Very few of the studies we reviewed reported process evaluation, which would provide useful insight about why some studies but not others noted desirable effects of an intervention.

## 8. Obesity Prevention Research on Adolescents

Obesity in adolescents has been found to be more predictive of obesity during adulthood than obesity in younger children is.<sup>19</sup> We need more studies to find effective prevention strategies for obesity that occurs in late childhood and adolescence. This is an important stage of life when young people are exposed to various social and environmental factors that establish lifelong habits.

## Conclusions

A large number of childhood obesity intervention studies have been conducted in high-income countries over the past three decades. They predominantly took place in school settings, and mostly in the United States. Many of the school-based studies also included intervention components implemented in other settings, such as the home and community. Overall, there is moderate to high strength of evidence that diet and/or physical activity interventions that are implemented in schools help prevent weight gain or reduce the prevalence of overweight and obesity. However, the evidence on the effectiveness of interventions primarily implemented in other settings is largely low or insufficient. We need more research to test interventions conducted in settings other than schools, especially to test the impact of policy and environmental changes. We need to encourage research that tests innovative interventions that take advantage of new technologies, behavioral theories, and methodologies, including systems science.

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# Introduction

## Background

### Condition

Childhood obesity is a serious public health problem in the United States (U.S.) and in many other countries worldwide.<sup>1-6</sup> Data from the 2007-2008 U.S. National Health and Nutrition Examination Survey indicated that over 30 percent of U.S. children and adolescents (ages 2-19) years are obese or overweight.<sup>7</sup> Obesity prevalence increased from 5 to 10.4 percent (children aged 2-5 years), 6.5 to 19.6 percent (children aged 6-11 years), and 5 to 18.1 percent (adolescents aged 12-19 years) between 1976-1980 and 2007-2008.<sup>7,8</sup> Some minority groups, such as African Americans, Hispanics, and Native Americans, and low-income groups are at higher risk of obesity.<sup>3,9-11</sup> However, the patterns are complicated, and not all low-income or minority groups are at high risk; the relationship between obesity and social-economic status has changed over time in the U.S.<sup>3,12</sup> Asian Americans have a lower prevalence of obesity than other ethnic groups, while higher income African American girls are more likely to be overweight than their lower income counterparts. On the contrary, there is an inverse relationship between obesity and social-economic status in white girls. However, social-economic status factors only explain a very small portion of the variations in body mass index (BMI), approximately 1 or 2 percent. Obesity is difficult to treat and prevention of childhood obesity has been identified as a key to fight the growing global obesity epidemic.

### Complex Causes of Obesity

Obesity is the result of many biological, behavioral, social, environmental, and economic factors and the complex interactions between them that promote a positive energy balance. At present, how these factors contribute to the disparities in obesity prevalence between population groups in the U.S. remain poorly understood. Nevertheless, a growing body of research adds to the understanding of a socio-ecological model for childhood obesity and suggests that many factors interact, such as individual factors (e.g., genetics, nutrition knowledge and attitude, body weight image), home influences (e.g., parenting, food served at home, parental weight status), school factors (e.g., nutrition service, curriculum including physical activity, annual BMI measure), factors in the local community (e.g., food environment, crime rate), and those at the regional and national levels (e.g., built environment, economic factors such as food prices, and food assistance programs).<sup>13</sup> They contribute to obesogenic environments and affect children's weight. A number of leading health organizations, including the World Health Organization<sup>14</sup> and the Institute of Medicine,<sup>15</sup> have recommended comprehensive interventions to prevent childhood obesity.<sup>16</sup>

### Measurement of Adiposity and Classification of Childhood Obesity

The public health, research and medical communities have used various measures to assess adiposity and childhood obesity, which is a challenge for researchers and other health professionals in the field as well as for researchers conduct reviews. Although studies have mostly used BMI in the classification of obesity in adults and children, it remains controversial regarding what BMI cut points are most appropriate for a specific population.<sup>17,18</sup> Researchers

have used different sex-age specific BMI percentile cut-points in the U.S. and worldwide.<sup>18-21</sup> For example, in the U.S., researchers have used two cut points, 85th (for “overweight”) and 95th percentiles (for “obesity”), to define the conditions in children. Must et al. published one in 1991 based on NHANES I<sup>22</sup> and the Centers for Disease Prevention and Control published the other based on the 2000 U.S. Center for Disease Control and Prevention growth charts and a series of datasets.<sup>23</sup> In general, the values of the two sets of percentiles are similar, but researchers developed them based on different data sets and growth curve fitting techniques.<sup>22-25</sup>

Researchers in the field have even used different terms for overweight and obesity among children. Before the mid-2000s, key health organizations including the World Health Organization and the U.S. Center for Disease Control and Prevention recommended the use of the term of “at risk of overweight” for “overweight”, and “overweight” for “obesity.” Some other health organizations, such as the International Obesity Taskforce, have recommended using the terms “overweight” and “obesity” the same as they do for adults, and not using the term of “at risk of overweight.” These discrepancies have further complicated the interpretation of the literature.

Additionally, BMI is an indirect measure of adiposity, and thus has several limitations. For example, it cannot distinguish between muscle mass and fat mass.<sup>19</sup> As a result, health care professionals have increasingly used other measures for various purposes, such as percentage of body fat measured via direct measures such as dual-emission X-ray absorptiometry, waist circumference (which measures central obesity), waist-to-height ratio, skinfold thickness, and related cut points, to assess adiposity and define obesity in adults and children. The correlations between direct and indirect measures of adiposity vary across age groups, degree of obesity, and lean muscle mass. Nevertheless, overall the correlations among them are strong.<sup>26,27</sup>

In summary, the definition of overweight and obesity has been evolving over time, and is not clear even today. This, combined with the controversy over the way we measure adiposity, makes it complicated to synthesize the existing literature. We recognize the need for studies to demonstrate both statistical significance ( $p$  value < 0.05) and biologically or clinically meaningful change (i.e., effect size) when demonstrating an effect of intervention programs. However, to our knowledge, there is no consensus in the pediatric obesity field regarding what effect size might be considered a meaningful change.

## **Consequences of Childhood Obesity**

Childhood obesity has many intermediate- and long-term health consequences. Overweight children and adolescents are at greater risk for health problems compared to their normal weight counterparts.<sup>1</sup> Overweight children and adolescents are more likely to become obese adults.<sup>28-30</sup> Obese children and adolescents are more likely to have adverse health conditions, such as poor cardiovascular, metabolic, and psychosocial outcomes.<sup>31</sup> However, the link between childhood and adulthood obesity was more prominent among older children.<sup>32</sup> Obesity is a risk factor for many chronic conditions, including type 2 diabetes, hypertension, high cholesterol, stroke, heart disease, nonalcoholic fatty liver disease, certain cancers, and arthritis.<sup>30,31,33,34</sup> It is estimated that excess weight causes 70 percent of diabetes in the U.S. Obesity increases mortality as well.<sup>33</sup> The other reported health risks of childhood obesity include eating disorders and mental health issues, such as depression and low self-esteem.<sup>34</sup> Obesity also has a lot of financial consequences. Overweight and obesity and their associated health problems have a significant economic impact on the U.S. health care system.<sup>35</sup> Childhood obesity in the U.S. is estimated to cost \$11 billion for children with private insurance and \$3 billion for children on Medicaid.<sup>36</sup> The health care

costs of an overweight or obese child are roughly 3 times or \$172 higher than the average normal-weight child, as obese children are 2 to 3 times more likely to be hospitalized and are far more likely to have health disorders than non-obese children.<sup>37,38</sup> Further, once developed, obesity is difficult to treat (i.e., due to the “set point theory”).<sup>39</sup> Therefore, it is important that children develop life-long healthy lifestyles to prevent obesity.

## **Types of Interventions for Prevention of Childhood Obesity**

Interventions for the prevention of childhood obesity have a primary goal of preventing children from gaining excessive body weight, including diet, physical or sedentary activity, or a combination of these interventions. Unlike weight-loss studies, these interventions do not have a goal of helping children lose weight. However, childhood obesity prevention studies often enroll a diverse population that includes obese and overweight children.

## **Scope of the Review**

This report focuses on the comparative effectiveness of obesity prevention programs in children conducted in high-income countries based on a variety of outcome measures of adiposity including clinical outcomes, eating and physical activity behavioral outcomes, and potential harms. We focus in this report on the comparative effectiveness of interventions; thus, outcomes need to be compared between two groups each of which received an intervention or two groups where one group received usual care or no intervention. This review mainly compares the effects of an intervention against a control. We compared obesity prevention programs to usual care, active control, and/or other obesity prevention programs. We grouped our results based on setting and intervention (e.g., school-based dietary interventions) to shed light on the effectiveness of different interventions (e.g., diet versus physical activity). However, due to the large heterogeneity across such intervention studies and the scope of our study, we could not conduct specific statistical analysis to compare them.

The review does not include treatment of overweight or obese children, which the Agency for Healthcare Research and Quality (AHRQ) recently reviewed. We reviewed studies according to the setting where the studies were conducted and our Key Questions (KQs) are as follow.

## **Key Questions**

**Key Question 1.** What is the comparative effectiveness of school-based interventions for the prevention of obesity or overweight in children?

**Key Question 2.** What is the comparative effectiveness of home-based interventions for the prevention of obesity or overweight in children?

**Key Question 3.** What is the comparative effectiveness of primary care-based interventions for the prevention of obesity or overweight in children?

**Key Question 4.** What is the comparative effectiveness of child-care setting–based interventions for the prevention of obesity or overweight in children?

**Key Question 5.** What is the comparative effectiveness of community-based or environment-level interventions for the prevention of obesity or overweight in children?

**Key Question 6.** What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or overweight in children?

**Key Question 7.** What is the comparative effectiveness of multisetting interventions for the prevention of obesity or overweight in children?

## **Interventions and Controversy About the Topic**

We differentiate between prevention, often called “intervention” in the childhood obesity research field, and treatment, also called “weight management.” The main goal of most childhood obesity prevention programs is to prevent non-overweight children from becoming overweight or obese, while the primary objective of obesity treatment programs is for obese patients to achieve healthy body weight (e.g., losing weight, improving height-to-weight ratio). However obesity prevention programs may also help overweight or obese children to lose weight or stabilize their weight. This review focuses on prevention. We did not review treatment of overweight or obese children, as a recent AHRQ report already reviewed this.<sup>40</sup>

Interventions to prevent obesity in children included diet (called “diet intervention” in this report), physical and/or sedentary activity (called “physical activity intervention”), or a combination of these (called “diet and physical activity intervention”). Note that a very small proportion of diet and physical activity intervention studies may also address other behaviors, such as self-weight monitoring. For clarity, and given there were a small number of such studies, we chose not to separate them from those that only diet and physical and/or sedentary activity interventions.

Some interventions included changes in individuals’ knowledge, attitudes and beliefs, and some included changes in the physical environment such as food provided in the school, but all of them aimed to change the energy balance by changing diet (energy intake) or physical activity (energy expenditure) or both. A growing consensus is that we need comprehensive intervention programs that involve multiple sectors in our society or that address multiple factors affecting energy balance behaviors to fight the obesity epidemic. However, studies to date have yielded mixed results.

We identified over 20 previous systematic reviews of childhood obesity prevention. Despite the many reviews (some as recent as 2011) there were few conclusions to guide decisionmaking. The majority of them focused on school-based interventions and did not include those that took place in other relevant settings, such as home, community, and primary care. Schools are the most frequent setting for interventions as they are convenient for RCTs; it is uncertain, however, if schools are the most effective setting in which to intervene. Most only focused on BMI and obesity rates outcomes, but did not examine the other important outcomes. And some systematic reviews confined their searches to evidence from a particular geographic region, such as in China, Europe, the United Kingdom, and the U.S.; and few included any quantitative pooling, which is a one key goal of systematic reviews. Additionally, many new studies have appeared since the publication of these earlier reviews.

## **Organization of This Report**

Because the interventions vary substantially across the settings, we organized this report first by the primary setting where the interventions took place (e.g., school, home) and then by the interventions within that setting. This should facilitate use of the evidence report as it is expected

that decision-makers are best able to implement interventions in the settings over which they have control (e.g. schools). This report describes 125 studies (described in 132 articles) classified by the setting or settings (e.g., school, home) where the interventions took place. Most of the studies we included in this report took place in multiple settings (e.g., both school and home), and therefore we eliminated KQ 7 in the reporting of our results, and put those studies under one of the six other KQs depending on their primary setting of intervention.

For each KQ, we present the results according to the study design (e.g., randomized controlled trials (RCTs) vs. non-RCTs) and then the intervention (e.g., dietary changes, physical or sedentary activity changes, or both (this may also address changes such as self-weight monitoring)).

We then describe the results ordered by outcomes, such as weight-related outcomes, clinical outcomes related to obesity (e.g., blood pressure, blood lipids), behavioral outcomes (e.g., dietary intake, physical activity), and adverse effects of interventions (Table 1 and Figure 1). The weight-related outcomes include weight or body composition outcomes (e.g., BMI, weight, BMI z-score, waist circumference, percent body fat, skinfold thickness, population prevalence of obesity or overweight).

**Table 1. Characteristics of the studies according to the PICOTS framework**

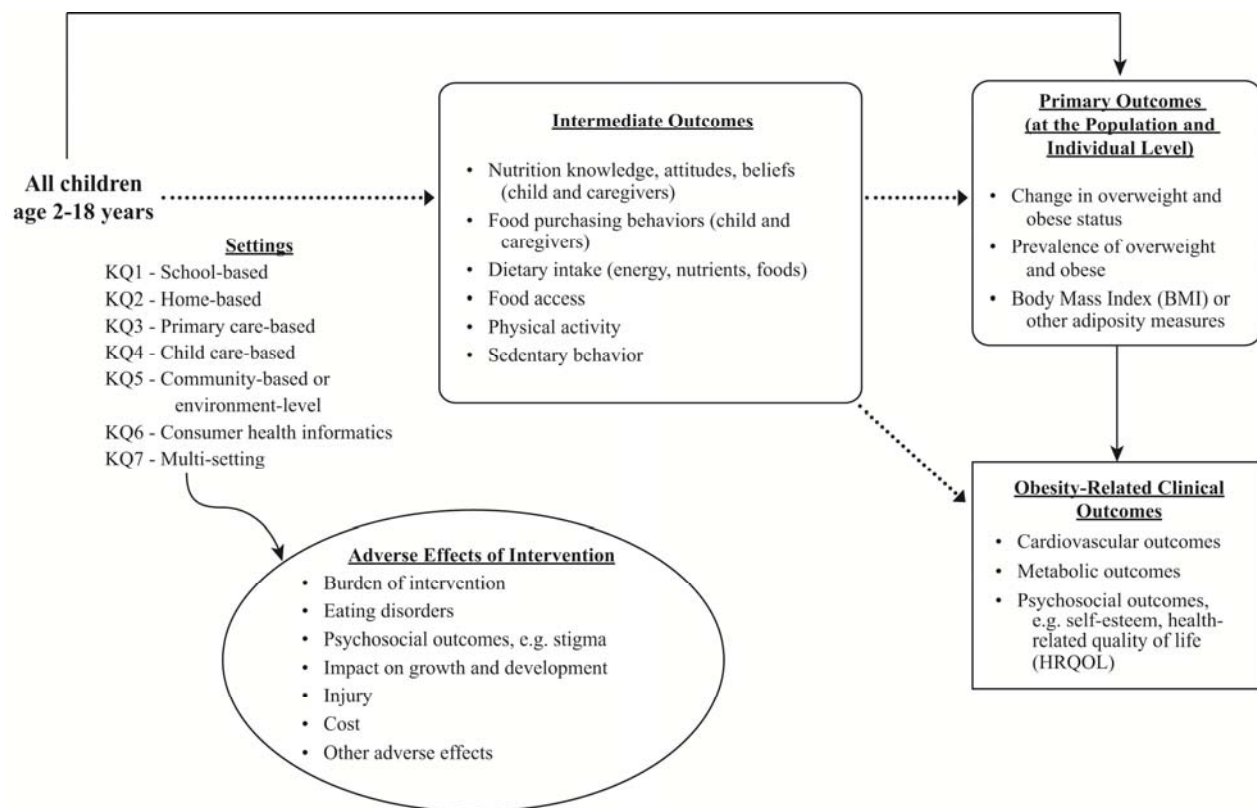
<b>Population(s)</b>	<b>All Children Between the Ages of 2 and 18 Years, Regardless of BMI Classification</b>
<b>Interventions</b>	<p>KQ 1: Examples of diet, physical activity or combination interventions delivered in schools.</p> <ul style="list-style-type: none"> <li>Includes: nutrition education, Nutrition, diet, healthy eating, parenting styles, education, policy</li> </ul> <p>KQ 2: Examples of diet, physical activity or combination interventions delivered or implemented in the home.</p> <ul style="list-style-type: none"> <li>Includes: healthy eating education, parenting styles, education</li> </ul> <p>KQ 3: Examples of diet, physical activity or combination interventions delivered or recommended in a primary care setting.</p> <ul style="list-style-type: none"> <li>Includes: patient, parent, and family counseling; referrals to nutritionists</li> </ul> <p>KQ 4: Examples of diet, physical activity or combination interventions delivered in a child-care setting.</p> <ul style="list-style-type: none"> <li>Includes menu changes, physical activity, policy</li> </ul> <p>KQ 5: Examples of diet, physical activity or a combination interventions delivered or implemented at the community level or through environmental modification.</p> <ul style="list-style-type: none"> <li>Includes: physical activity, farmer's markets, community gardens, cooking lessons, policy, green space, food store accessibility, access to healthy food choices</li> </ul> <p>KQ 6: Examples of diet, physical activity or a combination interventions delivered with consumer health informatics</p> <ul style="list-style-type: none"> <li>Includes: Web-based interventions, cell phone-based interventions</li> </ul> <p>KQ 7: Examples of diet, physical activity or combination interventions delivered across a combination of settings.</p>
<b>Comparisons</b>	<p>No intervention</p> <p>Usual care or other interventions by settings</p> <p>NOTE: We will compare the intervention group vs. the control group (i.e., those who did not receive intervention or received usual care or other interventions) within each study and then across studies within the same setting (e.g., schools, child-care centers).</p>

**Table 1. Characteristics of the studies according to the PICOTS framework (continued)**

Population(s)	All Children Between the Ages of 2 and 18 Years, Regardless of BMI Classification
Outcomes	<p>Primary outcomes</p> <ul style="list-style-type: none"> <li>Weight-related or body composition outcomes including in BMI or BMI distribution in the population, in adiposity or other weight measures, prevalence of obesity or overweight</li> </ul> <p>Intermediate outcomes</p> <ul style="list-style-type: none"> <li>Dietary intake, fruit and vegetable intake, fatty food intake, sugar-sweetened beverage intake, physical activity, sedentary activity.</li> </ul> <p>Adverse effects</p> <ul style="list-style-type: none"> <li>Correlates to eating disorders, psychosocial outcomes, impact on growth and development, injury, cost</li> </ul> <p>Obesity-related clinical outcomes</p> <ul style="list-style-type: none"> <li>Cardiovascular outcomes, metabolic outcomes, psychosocial outcomes</li> </ul>
Timing	Outcome assessment must be at least 6 months from the baseline assessment for KQ 1 school-based interventions. Outcome assessment must be at least 1 year from the baseline assessment for KQs 2 through 7 (if it does not include school-based interventions). Outcome assessment must be at least 6 months from the baseline assessment for KQs 2 through 7 (if the KQ includes school-based interventions).
Setting	Schools, home, primary-care clinics, child-care settings, or community organizations, environmental-level interventions, consumer health informatics, or across these settings

KQ = Key Question, CHI = Consumer Health Informatics

**Figure 1. Analytic framework for comparative effectiveness of childhood obesity intervention program**



KQ = Key Question

## Methods

The methods for this comparative effectiveness review follow the methods suggested in the Agency for Healthcare Research and Quality (AHRQ) “Methods Guide for Effectiveness and Comparative Effectiveness Reviews” (available at <http://www.effectivehealthcare.ahrq.gov/methodsguide.cfm>). The main sections in this chapter reflect the elements of the protocol established for the comparative effectiveness review; certain methods map to the PRISMA checklist.<sup>41</sup> We determined all methods and analyses a priori.

### Topic Refinement and Protocol Review

We developed the Key Questions (KQs) with the input of a key informant panel, which included experts in childhood nutrition policy, academic clinicians treating obese children, representatives from public school systems, parents of obese children, representatives from professional societies focusing on nutrition and obesity, and staff from AHRQ and the Scientific Resources Center. AHRQ posted these KQs on its Web site for public comment in July 2011 for 4 weeks and revised as needed. The KQs focus on the comparisons of methods for prevention of obesity in children. We recruited a Technical Expert Panel, which included experts on childhood obesity, primary care, obesity policy, and nutrition. These technical experts provided high-level expertise to the Evidence-based Practice Center during our development of the protocol for the comparative effectiveness review. Additionally, the Effective Health Care Program posted the KQs on its website for public comment and we discussed the KQs with the Technical Expert Panel.

### Key Definitions

#### Obesity and Overweight

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health. For children, obesity is defined based on age-sex-specific 95th body mass index (BMI) percentiles, while overweight, based on the 85th percentile. However, different studies might have used different BMI references, for example, some studies in European countries might use the 97<sup>th</sup> BMI percentile developed based on their country-specific data for obesity. Moreover, some studies may use other measures, such as the 90th percentiles of waist circumference (to define central obesity), skinfold thickness, and percentage of body fat. Note that until recently that the WHO and the US CDC ever recommended to use the term of "at risk of overweight" for "overweight" and use "overweight" for "obesity" in children and adolescents.<sup>19,22,23</sup>

#### Interventions for Prevention of Childhood Obesity

Our team came to a consensus on the definitions of the following settings and types of interventions in order to categorize the studies that we identified in our literature search. We grouped studies by the predominant setting of the intervention as we anticipated that this would best meet the needs of the users of this report.



## **School-Based Interventions**

School-based interventions are those studies that are carried out primarily in schools. Such interventions might also involve parents, as well some activities at home (e.g., homework, students bringing home flyers).

## **Home-Based Interventions**

Home-based interventions are those carried out in or through the child's home. For example, these may intervene to alter the foods purchased for home use or family fitness.

## **Primary Care-Based Interventions**

Primary-care based interventions are those carried out in or through the offices of a primary care practitioner, a clinic, or other health care entity delivering primary health care to children. Note that we classify school-based health care as a school-based intervention. Primary care-based interventions, which include a health informatics component, are classified under primary-care interventions.

## **Childcare-Based Interventions**

Child-care settings are those where children receive non-parental/non-custodian care, generally outside the home. We classify school-based after-care programs as school-based interventions. We classify childcare interventions delivered in other settings as childcare-based interventions.

## **Community-Based and Environment-Level Interventions**

Community-based and environment-level interventions include those interventions that result from policy, legislative, built environment, and economic/pricing/food subsidy interventions. We classified school-based policies with the school-based interventions. Additionally, these interventions involve interaction with the community (a group of individuals who exist prior to the intervention and who share one or more common characteristics such as the YMCA, Church groups).<sup>36</sup>

## **Consumer Health Informatics-Based Interventions**

Consumer Health Informatics encompasses technologies focused on indirect, as opposed to face-to-face, contact with patients as the primary users of health information. This includes Web-based, phone-based, and video-based programs, games, and information storehouses.

## **Search Strategy**

We searched the following databases for primary studies: MEDLINE<sup>®</sup> via PubMed, Embase<sup>®</sup>, PsychInfo, CINAHL<sup>®</sup>, and the Cochrane Library through August 11, 2012. We did not add any date limits to the search: PubMed catalogues articles to 1966; The Cochrane Library catalogues articles to 1989; CINAHL catalogues articles to 1982; Embase catalogues articles to 1974. We developed a search strategy for MEDLINE, accessed via PubMed<sup>®</sup>, based on medical subject headings (MeSH<sup>®</sup>) terms and text words of key articles that we identified a priori. (Appendix B) We reviewed the reference lists of all included articles, relevant review articles, and related systematic reviews to identify articles that might have been missed by the database

searches. We did not request Scientific Information Packets from any manufacturers as we were not studying any pharmaceuticals or devices.

We downloaded the results of the searches and imported them into ProCite® version 5 (ISI Research Soft, Carlsbad, Calif.). We scanned for exact article duplicates; author/title duplicates, and title duplicates using the duplication check feature in ProCite. We uploaded the articles from ProCite to DistillerSR (Evidence Partners, Ottawa, Ontario, Canada), a Web-based software package developed for systematic review and data management. We used this database to track the search results at the levels of title review, abstract review, article inclusion/exclusion, and data abstraction.

We conducted a grey literature search in ClinicalTrials.gov to identify unpublished research that was relevant to our review on July 23, 2012. The search strategies we used were comparable to those used in the MEDLINE search and are in Appendix B.

## Study Selection

We aimed to identify studies describing the comparative effectiveness of interventions to prevent obesity (or excessive weight gain) in children and adolescents 2 to 18 years old, conducted in the United States or other countries with a very-high Human Development Index based on the United Nations' report.<sup>42</sup> We included only randomized controlled trials and non-randomized trials, as we expected observational studies on this topic to be confounded and could not tested causality. We included only articles published in English, but reviewed the abstracts of non-English language articles to assess agreement with the results published in English. We did not exclude studies based on study size.

Studies were eligible for inclusion if they followed children for at least 1 year after the initiation of the intervention, or at least 6 months if it was a school-based intervention given the expectation that most studies would not observe children past the 9-month school-year (see Table 2).

The studies needed to compare results from any intervention targeting obesity prevention to results from usual care, or another different intervention, or no intervention. We also intended to include in this review studies that described results from natural experiments, such as those that described outcomes from a community that implemented a food policy change, compared to another community that did not. We did not include other observational studies, such as cross-sectional or cohort studies. We differentiated natural experiments from other observational study designs by specifying that a natural experiment was the implementation of a policy or similar intervention at a population level.

For inclusion in this review, we required that the study reported on the attained differences between the intervention and control groups in the prevalence of obesity or/and overweight, BMI or BMI distribution in the groups, or other weight and adiposity measures such as waist circumference, percentage of body fat, or skinfold thickness.

We excluded studies that targeted only at overweight or obese children or adolescents, and similarly excluded studies that targeted children on the basis of having a chronic medical condition like diabetes or heart disease. We excluded studies that expressly aimed to induce weight loss in the participants. We did not include studies that collected only qualitative results, such as from interviews or focus groups. We did not include studies published only in abstract form due to the sparseness of data in abstracts.

Trials identified in the grey literature search were required to meet the same inclusion criteria as studies identified in the regular searches.

## Data Extraction

We used DistillerSR (Evidence Partners, 2010) to manage the screening and review process. We uploaded all applicable citations identified by the search strategies to the system.

Two independent reviewers conducted title scans. For a title to be eliminated at this level, both reviewers had to indicate that the study was ineligible. If the reviewers disagreed, they advanced the article to the next level, abstract review. Two investigators independently reviewed abstracts and we excluded the abstracts if both investigators agreed that they met one or more of the exclusion criteria. We tracked and resolved differences between investigators regarding abstract inclusion or exclusion through consensus adjudication. Articles promoted on the basis of abstract review received an independent parallel review to determine if we should include them in review. We resolved differences by consensus adjudication.

We created standardized forms for data extraction. (Appendix C) Each article received a double review by study investigators for data abstraction. The second reviewer confirmed the first reviewer's data abstraction for completeness and accuracy. We formed reviewer pairs that included personnel with both clinical and methodological expertise. A third reviewer audited a random sample of articles selected by the first two reviewers to ensure consistency in the abstraction of data from the articles. We did not hide reviewers from the authors, institution, or journal for each article.

Reviewers extracted information on general study characteristics, study participants, eligibility criteria, interventions, outcome measures, the method of ascertainment, and the outcomes, including measures of variability where available. We entered all information from the article review process into the DistillerSR database. We used the DistillerSR database to maintain the data, and then exported it into Microsoft Excel for the preparation of evidence tables.

Data extraction followed a similar process for the trials identified during the grey literature search. Two independent reviewers conducted title scans. For a title to be eliminated at this level, both reviewers had to indicate that the study was ineligible. If the reviewers disagreed, the article was advanced to the next level. All trials that were advanced to level 2 were screened by two reviewers and disagreements were adjudicated by a third party reviewer.

## Quality (Risk of Bias) Assessment of Individual Studies

We used the Downs and Black instrument (see Appendix C) to assess the risk of bias in the included studies.<sup>43</sup> We opted to apply it by focusing on the questions that we felt were most relevant to this body of literature. To be considered to be a study at low risk of bias, the study must have done all of the following: stated the objective clearly, described the main outcomes, described the characteristics of the enrolled subjects, described the intervention clearly, described the main findings, randomized the subjects to the intervention group, and concealed the intervention assignment until recruitment was complete. Additionally, the study had to have at least partially described the distributions of (potential) principal confounders in each treatment group.

We categorized the studies as having low risk of bias, moderate risk of bias, or high risk of bias: (1) If we could not determine one of the above items or it was not done, we considered the study to have at least a moderate risk of being biased; (2) If studies definitively did not do two or more of the above items, we considered the study to have a high risk of bias; (3) We did not require other items that are typically expected in a well-conducted randomized trial due to the

types of interventions; that is, we did not require blinding for the study to be considered a low risk of bias study, and we did not require descriptions of loss to followup and complete adverse event reporting. Studies with a high risk of bias were thought to have significant flaws that might have invalidated the results.

## Data Synthesis

For each KQ, we created a set of detailed evidence tables containing all information abstracted from eligible studies. The elements that we abstracted about the interventions included the behavior (e.g., diet or/and physical activity), and the mode of delivery for the intervention (e.g., education, a modification of the environment, instruction in self-management techniques). We abstracted data on weight-related or body composition outcomes (e.g., change in prevalence of obesity, change in BMI or BMI distribution in the population, changes in adiposity or other weight measures, prevalence of obesity or overweight), obesity-related clinical outcomes, adverse effects of the interventions, and intermediate outcomes (e.g., nutrition knowledge, food purchasing behaviors, calorie intake, diet composition, physical activity). We extracted information about the primary weight outcomes at the time points of 24 weeks (for school-based studies only), 52 weeks, between 54 and 104 weeks, and greater than 104 weeks.

We pooled the outcomes quantitatively (conducted meta-analysis) when we had three or more randomized controlled trials with similar interventions in comparable settings that were homogeneous. We first confirmed that the studies were sufficiently qualitatively homogenous with respect to the population characteristics, intervention, comparison, outcomes, and timing. For studies amenable to pooling with meta-analyses, we calculated pooled mean differences using a DerSimonian and Laird random effects model.<sup>44</sup> We did not conduct meta-analysis regarding other measures of the intervention effects such as odds ratio or relative risk estimates due to the limited number of comparable studies that reported such results. The result of each meta-analysis contributed to our assessment of the precision of the estimate of the outcome, which we used in our grading the strength of evidence.

We identified statistical heterogeneity between the studies using a chi-squared test with a significance level of alpha less than or equal to 0.10, and an I-squared statistic with a value greater than 50 percent indicating substantial heterogeneity. We conducted all meta-analyses using STATA (Intercooled, version 11, StataCorp, College Station, Texas).

We reviewed the studies for outcomes by key subgroups including outcomes reported by sex, age, or racial group, and reported the results separately by subgroups and pooled the data where appropriate.

We describe the evidence about the following outcomes: prevention of obesity or overweight (combined outcome of all weight-related outcomes), intermediate outcomes, clinical outcomes, and adverse events. Because of the diversity of measures, we did not calculate an effect size. Furthermore, the frequent lack of reporting of measures of variation made it impossible to calculate effect sizes. Rather our conclusions indicate whether the intervention suggests benefit, no benefit, or unknown benefit. We could not explicitly state whether the reported effects met a clinically relevant threshold as this is not well established in the obesity research community.

## Strength of the Body of Evidence

In our results, we reported both the strength of evidence and the magnitude of effect (e.g., the difference in changes in BMI between the intervention and control group), but strength of evidence was the primary focus. Our meta-analysis reported magnitude of effect. After

synthesizing the evidence, we graded the quantity, quality, and consistency of the best available evidence addressing each of our KQs by adapting an evidence grading scheme recommended in the Methods Guide for Conducting Comparative Effectiveness Reviews.<sup>56</sup> In assigning evidence grades, we considered the four recommended domains including risk of bias in the included studies, directness of the evidence, consistency across studies, and precision of the pooled estimate or the individual study estimates.

We graded the evidence, for each setting, by intervention, comparator, and then by outcomes. We grouped the interventions for grading purposes as: 1) all diet interventions, 2) all physical activity interventions, and 3) all combined diet and physical activity interventions. We assigned grades for all weight-related outcomes together with each study contributing only one weight-related measure to the grade by setting up a hierarchy of outcomes. The hierarchy was set as follows: BMI z-score, BMI, prevalence of obesity and overweight, percent body fat, waist circumference, skinfold thickness. If a study measured BMI z-score and body fat, we only graded BMI z-score. We chose to use this hierarchy because these outcomes are closely correlated within an individual--particularly BMI and BMI z-score. We graded six categories of intermediate outcomes: change in energy (caloric) intake, change in fruit and vegetable intake, change in fatty food intake, change in sugar-sweetened beverage intake, change in physical activity, and change in sedentary activity. We did not grade adverse events, or clinical outcomes. Conclusions about the benefit of an intervention are unlikely to change with the addition of evidence grades for highly correlated outcomes. We did not grade adverse events, there were too few studies overall to do this. We graded selected intermediate outcomes; these were change in physical activity, change in food intake (e.g., fruit and vegetable intake, fatty foods intake, and sugar-sweetened beverage intake), change in energy intake, and change in physical activity. We chose to grade these intermediate outcomes as they are most likely to directly influence the weight outcomes.

We classified evidence pertaining to the KQs into four categories: 1) “high” grade (indicating high confidence that the evidence reflects the true effect, and further research is very unlikely to change our confidence in the estimate of the effect); 2) “moderate” grade (indicating moderate confidence that the evidence reflects the true effect, and further research may change our confidence in the estimate of the effect and may change the estimate); 3) “low” grade (indicating low confidence that the evidence reflects the true effect, and further research is likely to change our confidence in the estimate of the effect and is likely to change the estimate); and 4) “insufficient” grade (evidence is unavailable or there was only one study having more than a low risk of bias). We caution that a “high” strength of evidence grade is not necessarily an indicator of effectiveness – there can be strong evidence that an intervention is ineffective or even strong evidence of no effect.

We considered the body of evidence consistent in direction if 70 percent or more of the studies had an effect in the same direction (i.e., showed desirable effect verse not). We did not require a minimum number of studies to apply this rule, for example, a body of evidence with two positive and one negative study would be graded as inconsistent. We identified all studies as providing direct evidence since all of the studied interventions would directly affect one of our primary outcomes. We considered a study precise if the results for the given outcome were significant at a p value less than 0.05, or had narrow confidence intervals that excluded the null. If 70 percent or more of the studies that reported statistical significance had significant results, we considered the body of evidence precise. We did not require a minimum number of studies to apply this rule, for example, a body of evidence with two precise and one imprecise study would

be graded as imprecise although we recognize that if the studies had been amenable to pooling, the precision might have increased with pooling.

We applied a grading algorithm to the body of evidence to have consistent grading across questions. If we found two studies with low risk of bias that had consistent direction of outcomes and no studies with a low risk of bias with outcomes in the opposite direction, we considered this to be high strength of evidence. If we found one study with low risk of bias and two or more studies with a moderate risk of bias, and they were all in a consistent direction, and no study with a low risk of bias with outcomes in the opposite direction, we considered this high strength of evidence. If there were no studies with a low risk of bias and the moderate risk of bias studies were consistent or predominantly consistent (>70 percent), we considered this moderate strength of evidence. If there were no low risk of bias studies and the studies with moderate risks of bias were inconsistent, we considered this low strength of evidence, the same is true of anything weaker than this.

## Applicability

We assessed applicability separately for each question guided by the PICOTS framework as recommended in the Methods Guide for Comparative Effectiveness Reviews of Interventions.<sup>52</sup> We assessed whether there were features of the individual studies which limited the applicability of the study's findings to the general population.

## Peer Review and Public Commentary

We invited experts in childhood obesity prevention and management, obesity policy, and individuals representing stakeholder and user communities to provide external peer review of this comparative effectiveness review. AHRQ and an associate editor also provided comments. AHRQ posted the draft report on its website for 4 weeks to elicit public comment. We addressed all reviewer comments, revised the text as appropriate, and documented our responses in a disposition of comments report that we will make available 3 months after AHRQ posts the final review on its website.

**Table 2. Inclusion and exclusion criteria**

<b>Population and condition of interest</b>	We include studies of children and adolescents aged 2-18 years, regardless of BMI classification. We exclude studies targeting only overweight or obese subjects. We exclude studies targeting subjects with diseases/chronic conditions (T2DM, CVD).
<b>Interventions</b>	We exclude studies that did not include an intervention aimed at obesity prevention or affecting energy-balance behaviors. We exclude studies that aim at weight loss (obesity treatment).
<b>Comparisons of interest</b>	Studies must compare the intervention to no intervention, usual care, or other interventions within or across settings, or compare to prior conditions for natural experiment studies.
<b>Outcomes and timing</b>	All studies must report changes or differences between the intervention and control groups in the prevalence of obesity and/or overweight, BMI or BMI distribution in the population, adiposity or other weight measures, such as waist circumference or body fat. Intermediate outcomes include: nutrition knowledge, attitudes, beliefs, and diet and physical activity behavior changes. Adverse effects include: eating disorders; psychosocial outcomes; Impact on growth and development; Injury; cost Obesity-related clinical outcomes include: cardiovascular outcomes; metabolic outcomes; psychosocial outcomes Outcome assessment must be at least 1-year after the baseline assessment for KQs 2 through 7 (if does not include school-based interventions). Outcome assessment must be at least 6 months after the baseline assessment for KQ 1 or for other KQ that include a school-based intervention.

**Table 2. Inclusion and exclusion criteria (continued)**

<b>Type of study</b>	We include experimental, quasi-experimental interventions and natural experiments. We exclude studies with no original data (e.g., reviews, editorials, comments). We exclude non-interventional studies (e.g., cross-sectional and cohort studies, case reports). We exclude studies published only as abstracts. We exclude qualitative studies that do not provide quantitative information on an approach of interest and weight or adiposity, such as focus groups or directed interviews We include pilot studies of an experimental design.
<b>Setting</b>	We include studies conducted in any of the settings described in the Key Questions. We limit our investigation to studies conducted in countries with a very-high Human Development Index. <sup>42</sup>

BMI = body mass index, CVD = cardiovascular disease, KQ = Key Question, T2DM = type 2 diabetes mellitus

# Results

## Introduction

We organized the results by Key Question (KQ) (see Introduction for a complete list of KQs). For example, if a study was primarily based in a school but had some home components, we reported the results under KQ 1 (school-based interventions). Each setting is subdivided by intervention (diet-only, physical activity-only, or combination of diet and physical activity).

## Results of the Literature Search

The literature search identified 34,544 unique citations. During the title screening, we excluded 28,344 citations. During the abstract screening, we excluded 5,600 citations that met at least one of the exclusion criteria (see Chapter 2 for details). During article screening, we excluded an additional 470 articles that did not meet one or more of the inclusion criteria (see Appendix D). In total, we included 131 articles, which reported on 124 studies (i.e., some studies were described in multiple articles), in the review (Figure 2). The majority (104 out of the 124 studies) were school-based studies, which might have included intervention components conducted in other settings such as at home.

We conducted a grey literature search of ClinicalTrials.gov (see Appendix B) and identified 3,186 potentially relevant titles. A title screen excluded 2,826 of the trials. Of the 342 potentially relevant trials none that apply to this systematic review were completed, or data was not available.

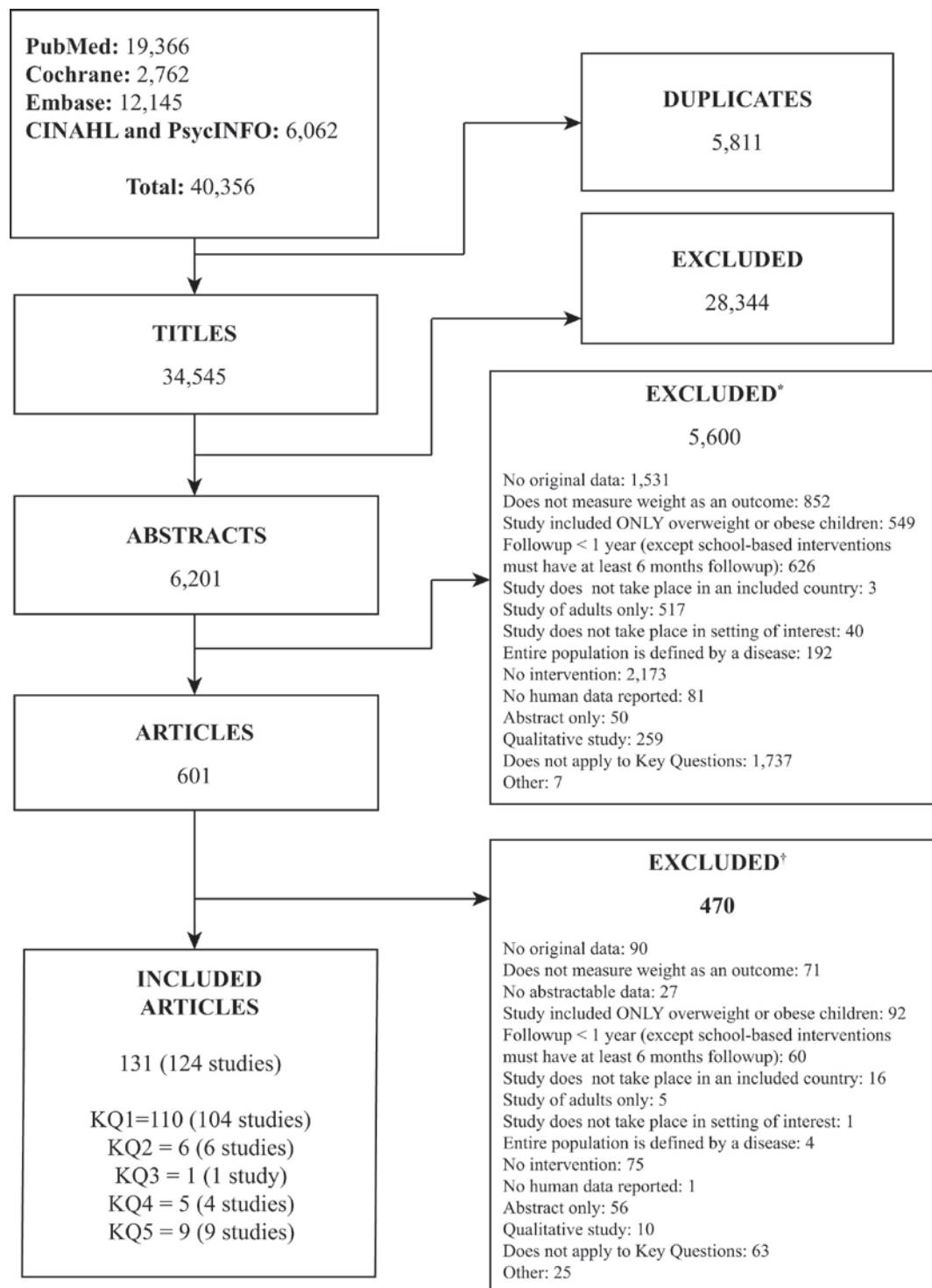
## Description of Types of Studies Retrieved

One hundred and four studies described in 110 articles addressed KQ 1 (school-based interventions); six studies addressed KQ 2 (home-based interventions); one study addressed KQ 3 (primary care-based interventions); four studies described in five articles addressed KQ 4 (child-care center-based interventions); nine studies addressed KQ 5 (community-based interventions); and no studies directly addressed KQ 6 (consumer health informatics-based interventions). We addressed KQ 7 (combination settings) under the above KQs.

Eighty-three studies were randomized controlled trials (RCTs). Of those, 69 addressed KQ 1, six addressed KQ 2, none addressed KQ 3, three addressed KQ 4, and five addressed KQ 5. Eighty-three studies stated that their goal was obesity prevention: 66 of these addressed KQ 1, six addressed KQ 2, one addressed KQ 3, two addressed KQ 4, and eight addressed KQ 5. Of the studies stating that their goal was obesity prevention, 54 were RCTs. Of those, 43 addressed KQ 1, five addressed KQ 2, none addressed KQ 3, two addressed KQ 4, and four addressed KQ 5.



**Figure 2. Results of the literature search**



\*Sum of excluded abstracts exceeds 5,600 because reviewers were not required to agree on reasons for exclusion.

†Sum of excluded abstracts exceeds 470 because reviewers were not required to agree on reasons for exclusion.

KQ 1: What is the comparative effectiveness of school-based interventions for the prevention of obesity or overweight in children?

## **Key Points**

### **School-Only–Based Studies**

The strength of evidence is moderate that diet or physical activity interventions are more effective at preventing obesity and insufficient that a combination of diet and physical activity is more effective at preventing obesity or overweight than the control.

Heterogeneity of outcomes graded to determine strength of evidence in combination diet and physical activity settings prevented us from conducting a true meta-analysis for this intervention. We analyzed studies with sufficient data to determine impact on BMI and BMI z-score and found that these specific outcomes were positively impacted.

### **School-Home–Based Studies**

Only one study investigated the effectiveness of a diet intervention on obesity prevention. This RCT, with 1,321 students, demonstrated a significant decrease in the prevalence of overweight and obese children as a result of the intervention. However, since there is only one study, and the risk of bias is moderate, the strength of the evidence is insufficient that diet interventions are more effective in preventing obesity or overweight than the control.

Of the three physical activity intervention studies that measured change in BMI, all showed a statistically significant reduction in the intervention group relative to the control group. The strength of the evidence is high that physical activity interventions are more effective in preventing obesity or overweight than the control intervention.

Twenty-seven studies conducted in both the school and home settings implemented interventions of both diet and physical activity. Among these 27 studies, 21 demonstrated a favorable effect of the intervention on weight outcomes compared to the control. However, only 10 of the studies had statistically significant results. The strength of the evidence is moderate that diet and physical activity-combined interventions are more effective in preventing obesity and overweight than the control.

### **School-Home-Community–Based Studies**

Out of nine studies, two studies in this setting showed a significant desirable effect on obesity prevention, both of which intervened on a combination of diet and physical activity.

The strength of evidence is insufficient that physical activity interventions are more effective at preventing obesity or overweight than the control, based on one non-RCT study.

The strength of evidence is high that combined diet and physical activity interventions are more effective at preventing obesity or overweight than the control, based on four RCTs and four non-RCTs. Among those reported, around half found desirable and significant changes in BMI, BMI z-score, prevalence of overweight or obesity, percentage of body fat, and waist circumference.

### **School-Community–Based Studies**

Out of six studies in this setting, two showed a significant desirable effect: one intervened on diet, and the other intervened on a combination of diet and physical activity.

The strength of evidence is insufficient that a diet intervention is more effective at preventing obesity or overweight than the control, based on one RCT. The single study did show significant lower incidence rate for overweight in the intervention as compared to the control (p=0.018).

The strength of the evidence is moderate that combined diet and physical activity interventions is more effective at preventing obesity or overweight than the control, based on one RCT and three non-RCTs. The two studies with moderate risk of bias showed a favorable effect and there was no other low risk of bias studies in the opposite direction.

The strength of the evidence is insufficient that a physical activity and self-management intervention is more effective at preventing obesity or overweight than the control, based on one RCT. This study shows no difference between the intervention and control groups.

## **School-Consumer Health Informatics–Based Studies**

Four studies took place in this setting. The evidence is insufficient that school with consumer health informatics physical activity or combined diet and physical activity interventions prevent obesity or overweight in children.

## **School-Home-Consumer Health Informatics–Based Studies**

One study took place in this setting. The evidence is insufficient that school, home, consumer health informatics combination diet and physical activity interventions prevent obesity or overweight in children.

## **School-Only–Based Studies**

### **Study Characteristics**

Fifty-four studies, described in 58 articles reported on school-only-based interventions. Thirty-six of these studies were RCTs. Twenty-three of the RCTs had a stated goal of obesity prevention in children.<sup>45-63</sup> Thirteen RCTs took place in the U.S.<sup>45,46,48,50,56,57,64-70</sup> The remaining RCTs took place in Australia, Belgium, Canada, the Northern Marianas, France, Germany, Greece, Iceland, Italy, New Zealand, Poland, Portugal, Spain, Switzerland, and the United Kingdom (Table 3; Appendix E, Evidence Table 1).

Seven RCTs (19.4 percent) did not specify inclusion or exclusion criteria.<sup>51,56,65,71-74</sup> Three RCT's included girls only,<sup>50,60,68</sup> two RCT's included boys only,<sup>57,59</sup> and the remainder did not use sex as an exclusion criteria. Of the eight RCTs that used age range as an inclusion criteria, one included only children under 5 years old,<sup>75</sup> two included children ages 5 to 7 years,<sup>53,58</sup> two included children ages 6 to 10 years,<sup>63,76</sup> one included children ages 7 to 11 years,<sup>49,54</sup> and two included children ages 8 to 12 years.<sup>57,68</sup> Many RCTs used grade level as an inclusion criteria; one included "pre-school" children,<sup>77</sup> eight included children in grades 1, 2, or 3;<sup>45,48,53,58,64,76,78,79</sup> two included children in grades 3 to 5;<sup>57,68</sup> ten included children in grades 4, 5, or 6;<sup>46,52,66,67,69,70,80-83</sup> one included "primary school" children;<sup>47</sup> two included children in grades 7, 8, or 9;<sup>59,60</sup> and one included "junior high school" children.<sup>54</sup> We list additional inclusion criteria in Table 3 and Appendix E, Evidence Table 1.

Eighteen of the school-based studies were non-RCTs: 16 were clinical trials (non-randomized), one was pre-post design, one was a natural experiment, one was a pilot study and two were quasi-experimental. Ten of the non-RCTs had a stated goal of weight maintenance or obesity prevention in children.<sup>84-94</sup> Seven took place in the U.S.,<sup>74,85,86,89,95-97</sup> and the remainder

took place in Canada, Germany, Chile, Croatia, Greece, Italy, New Zealand, Norway, Spain and Sweden (Table 3; Appendix E, Evidence Table 1).

Seven of these non-RCTs (39 percent) did not specify inclusion criteria.<sup>85,94,95,97-100</sup> Three included girls only,<sup>92,93,101</sup> and the remainder did not specify any sex for enrollment. Two studies restricted study participation by age, enrolling 9 to 11 year olds,<sup>89</sup> and 16 to 18 year olds.<sup>93</sup> The remainder of the non-RCTs did not limit participation by age. Eleven non-RCTs restricted participation by grade. One limited participation to preschoolers;<sup>102</sup> one to first-graders;<sup>103,104</sup> two to children in grades 1 or 2;<sup>92,101</sup> four to children in grades 3, 4, or 5;<sup>86,90,93,96</sup> one to children in grades 7 thru 9;<sup>91</sup> and one to children in grades 1 to 8.<sup>84</sup> The remaining studies did not limit participation by grade level. Other inclusion criteria are in Table 3 and Appendix E, Evidence Table 1.

## Population Characteristics

The number of participants across all RCTs was 31,126; each individual RCT included between 100 and 6,413 participants. Three RCTs included only girls.<sup>50,60,68</sup> The remainder of the RCTs had between 36 and 60 percent girls enrolled or did not report on this characteristic. Seventeen RCTs had participants in elementary grades (ages 6.1 to 9.7 years) (Table 3; Appendix E, Evidence Table 2).<sup>47-49,51,53,55,57,58,61,62,64,66,68,69,73,76,77,79</sup> Thirteen RCTs had participants in middle-school (ages 10 to 15.8 years),<sup>46,50,52,56,59,60,67,70-72,81,83,105</sup> and eight did not report on the age of their participants.<sup>45,54,63,65,74,78,80,82</sup>

There were 18 non-RCTs that included from 77 to 4,500 participants, with 12,405 participants across studies. Of the non-RCTs reporting on sex, three enrolled only girls,<sup>92,93,101</sup> and the others had between 38 and 59.7 percent girls enrolled. Of the non-RCTs reporting on age, all children were between 6 and 15 years old (Table 3; Appendix E, Evidence Table 2).<sup>64,84-87,91,92,95,97-99,101,106</sup>

Fourteen non-RCTs reported on grade range. Twelve included participants in elementary school,<sup>64,85-87,92,94,95,97-99,101,106</sup> four included participants in middle school,<sup>84,88,89,91</sup> and one included participants in grades 2 through 6.<sup>85</sup> The majority of studies did not report on participant race. One non-RCTs had only black non-Hispanic participants,<sup>85</sup> one study had up 94.2 percent Latin/Hispanic participants,<sup>74</sup> three studies had at least 80 percent white non-Hispanic participants,<sup>92,99,106</sup> and one study had a population of mixed races (Table 3; Appendix E, Evidence Table 2).<sup>96</sup>

## Interventions

Thirty-six of the 54 studies were RCTs. four RCTs described in four articles had arms that included diet interventions.<sup>49,54,55,64,83</sup> These RCT's were directed at dietary changes and utilized educational interventions.<sup>49,54,55,64,83</sup> Ten RCTs had arms that included physical activity interventions.<sup>45,52,57,73,76,79,80,82,83,105</sup> Of these, one RCT had arms that included education-only interventions,<sup>105</sup> five had arms that included environment-only interventions,<sup>52,57,73,76,79</sup> and four had arms that included both educational and environmental physical activity interventions.<sup>45,80,82,83</sup> Twenty-four RCTs had arms that included both diet and physical activity interventions.<sup>46-48,50,51,53,56,58-63,65-72,74,78,84</sup> Nine RCTs had arms that included a combination of diet, physical activity, and self-management interventions.<sup>46,47,50,55,56,67,70,72,78</sup> One RCT had intervention arms that were dietary interventions only, physical activity interventions only, and a combined diet and physical activity intervention arm.<sup>83</sup> As such, we counted the study in all three

categories listed above. Other combinations of interventions are on Table 4 and Appendix E, Evidence Table 3.

No non-RCTs addressed diet interventions. Nine of the 18 non-RCTs tested physical activity interventions.<sup>86,87,92,93,95,96,98,101,106</sup> One arm included educational intervention only,<sup>95</sup> six had arms that included environmental interventions only,<sup>87,92,93,98,101,106</sup> and the remainder included both educational and environmental interventions.<sup>86,96</sup> Ten non-RCTs had arms that included diet and physical activity (Table 4; Appendix E, Evidence Table 3).<sup>74,84,85,88,90,91,94,97,99,100,103,104</sup>

**Table 3. Study and participant characteristics of studies based only in schools**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks <sup>†</sup>	% Girls <sup>†</sup>	Mean Age [Range] Years <sup>†</sup>	Grade <sup>†</sup>	Race <sup>†</sup>
Amaro, 2006 <sup>72</sup>	Y	N	Italy	NR	NR	NR	NR	241	26	44.8	11-14	Middle school	WNH 100
Barbeau, 2007 <sup>68</sup>	Y	N	U.S.	NR	8-12	3,4,5	BNH, <300 lbs., no meds, regular physical activity	201	43	100	9.5	Elementary school	BNH 100
Bronikowski, 2011 <sup>105</sup>	Y	N	Poland	NR	NR	NR	NR	137	130	NR	13.2	NR	NR
Burguera, 2011 <sup>91</sup>	N	Y	Spain	NR	NR	7-9	Could not be part of any federated sport team or organized after-school sports.	90	26	59.7	13.9	NR	NR
Bush, 1989 <sup>70</sup>	Y	N	U.S.	NR	NR	4-6	NR	1,041	104	54	10.5	NR	NR
Chiodera, 2008 <sup>106</sup>	N	N	Italy	NR	NR	NR	BMI<30, no major pathologies, no outside physical activity	4,500	34	50.1	6-10	Primary school	NR
Coleman, 2011 <sup>64</sup>	Y	N	U.S.	NR	NR	2, 3, 6	NR	NR	104	57	8.9	NR	Mixed
Damon, 2005 <sup>94</sup>	N	Y	Austria	NR	NR	NR	NR	481	43	NR	10-12	1	NR

**Table 3. Study and participant characteristics of studies based only in schools (continued)**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks†	% Girls†	Mean Age [Range] Years†	Grade†	Race†
DeBar, 2011 <sup>65</sup>	Y	N	U.S.	NR	NR	6	Schools were at least 50% of students were eligible for welfare, black, or Hispanic.	4603	104	Arm1: 46.5 Arm2: 58.6 Arm3: 49.3	11.2-11.3	NR	Mixed
Donnelly, 2009 <sup>45</sup>	Y	Y	U.S.	NR	NR	2&3	NR	1,527	156	51.7	NR	NR	Mixed (all)
Foster, 2012 <sup>46</sup>	Y	Y	U.S.	NR	NR	6	50% of children in the school needed to be eligible for federally subsidized lunches; 50% of the students had to be black or Hispanic	4,603	156	52.7	11.3	6	Hispanic: 54.2 Black: 18.0 White: 19.3 Other: 8.5
Fung, 2012 <sup>90</sup>	N	Y	Canada	NR	NR	5	NR	NR	104	Arm1: 50.7 Arm2: 48.5	NR	5	NR
Gortmaker, 1999 <sup>56</sup>	Y	Y	U.S.	NR	NR	NR	NR	1,295	104	48	11.7	NR	Mixed (all)
Graf, 2008 <sup>47</sup>	Y	Y	Germany	NR	NR	Primary school	NR	615	208	48.9	6.8	Primary school	NR
Gutin, 2008 <sup>48</sup>	Y	Y	U.S.	NR	NR	3	NR	210	138	53	8.5	3	BNH >50
Haerens, 2006 <sup>71</sup>	Y	N	Belgium	NR	NR	NR	NR	2,840	95	36.6	13.06	7-8	NR
Heelan, 2009 <sup>95</sup>	Y	N	U.S.	NR	NR	NR	NR	324	78	55	8.3	1-5	NR
Howe, 2011 <sup>57</sup>	Y	Y	U.S.	Boys	8-12	3-5	Weigh <300lbs Not taking medication No physical impairment to regular PA	106	40	NR	9.7-9.9	3-5	BNH 100
Jago, 2011 <sup>81</sup>	Y	N	U.S.	NR	NR	6	NR	6,413	NR	52.4	11.3	NR	Mixed (all)

**Table 3. Study and participant characteristics of studies based only in schools (continued)**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks†	% Girls†	Mean Age [Range] Years†	Grade†	Race†
James, 2004 <sup>49</sup>	Y	Y	U.K.	NR	7-11	NR	Parental consent	644	52	50	8.7	NR	NR
James, 2007 <sup>54</sup>	Y	Y	U.K.	NR	7-11	Jr. high school	NR	644	39	50	NR	NR	NR
Kafatos, 2005 <sup>78</sup>	Y	N	Greece	NR	NR	1	NR	541	312	NR	NR	NR	NR
Kain, 2009 <sup>84</sup>	N	Y	Chile	NR	NR	1-8	NR	2,430	314	38	10	NR	NR
Klish, 2012 <sup>74</sup>	N	N	U.S.	NR	NR	3-5	NR	1,289	36	Arm1: 49.4 Arm2: 46.3	7.86-7.95	NR	Latin/ Hispanic >92
Lazaar, 2007 <sup>79</sup>	Y	N	France	NR	NR	1,2	No know disease, no other studies	425	26	50	7.4	NR	NR
Llargues, 2012 <sup>58</sup>	Y	Y	Spain	NR	5-6	1	No special diet, no physical activity incapacities	509	208	Arm1: 45.6 Arm2: 46.3	6-8	NR	NR
Lubans, 2012 <sup>59</sup>	Y	Y	Australia	Boys	NR	9	Speak English	100	24	NR	14.3	9	NR
Lubans, 2012 <sup>60</sup>	Y	Y	Australia	Girls	NR	8	Low SES	357	52	100	13.8	8	Australian 85.4 Asian 1.1 European 10.1
Madsen, 1993 <sup>67</sup>	Y	N	U.S.	NR	NR	5, 6	No high BP, no CVD, no high cholest- erol	314	104	NR	12	5-6	NR
Magnusson, 2012 <sup>61</sup>	Y	Y	Iceland	NR	NR	NR	Born in 1999	266	NR	Arm1: 60 Arm2: 51	7.3-7.4	NR	WNH 100
Manios, 1999 <sup>103</sup>	N	N	Greece	NR	NR	1	NR	1,046	156	NR	NR	NR	NR
Manios, 2002 <sup>104</sup>	N	N	Greece	NR	NR	1	NR	1,046	312	47	NR	NR	NR
Manios, 2006 <sup>100</sup>	N	N	Greece	NR	NR	NR	NR	441	312	NR	NR	1-5	NR
Metcalfe, 2012 <sup>77</sup>	Y	Y	Switzer- land	NR	NR	Pre- school	NR	652	47	50	5.2	NR	NR



**Table 3. Study and participant characteristics of studies based only in schools (continued)**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks†	% Girls†	Mean Age [Range] Years†	Grade†	Race†
Muckelbauer, 2009 <sup>55</sup>	Y	Y	Germany	NR	NR	NR	School level randomization	3,190	NR	49.7	8.3	2-3	NR
Neumark-Sztainer, 2010 <sup>50</sup>	Y	Y	U.S.	Girls	NR	NR	No high-level physical activity, no eating disorder	356	36-52	100	15.8	NR	Mixed (all)
Newton, 2010 <sup>85</sup>	N	Y	U.S.	NR	NR	NR	NR	77	78	50	9.26	2-6	BNH 100
Reed, 2008 <sup>82</sup>	Y	N	Canada	NR	NR	4- 5	No health condition limiting physical activity	268	NR	NR	NR	NR	NR
Resaland, 2011 <sup>87</sup>	N	N	Norway	NR	NR	4	NR	256	104	Arm1: 57 Arm2: 56	9.2	NR	NR
Rosario, 2012 <sup>62</sup>	Y	Y	Portugal	NR	NR	NR	Attend public elementary schools	464	24	51.5	8.3	NR	NR
Rush, E, 2012 <sup>63</sup>	Y	Y	New Zealand	NR	5-10	NR	NR	NR	104	50.2	NR	NR	European 67.3; Maori 25.7; Others 7
Sahota, 2001 <sup>51</sup>	Y	Y	U.K.	NR	NR	NR	NR	636	NR	NR	8.3	4-5	NR
Sallis, 1993 <sup>86</sup>	Y	Y	U.S.	NR	NR	4	NR	549	NR	44	9.25	4	WNH >80
Sallis, 2003 <sup>75</sup>	Y	N	US	NR	>5	NR	NR	1,858	156	48.2	7.7	NR	Mixed (All)
Salmon, 2008 <sup>80</sup>	Y	Y	Australia	NR	NR	5	Low SES	306	39	51	NR	NR	NR
Scheffler 2007 <sup>102</sup>	N	N	Germany	NR	NR	Pre-school	NR	264	104	NR	NR	NR	NR
Skybo, 2002 <sup>96</sup>	N	N	U.S.	NR	NR	NR	English speakers	58	39	48	NR	3	Mixed (all)
Smolak, 2001 <sup>89</sup>	N	N	U.S.	NR	9-11	NR	NR	509	104	49.5	NR	6	NR
Sollerhed, 2008 <sup>98</sup>	Y	Y	Sweden	NR	NR	NR	NR	132	156	44.6	6-9	NR	NR

**Table 3. Study and participant characteristics of studies based only in schools (continued)**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks†	% Girls†	Mean Age [Range] Years†	Grade†	Race†
Stenevi- Lundgren, 2009 <sup>92</sup>	N	N	Sweden	Girls	NR	1-2	Healthy girls, no meds	103	52-104 (Control group was followed for 104)	100	7.9	1-2	WNH 100
Stock, 2007 <sup>88</sup>	N	Y	Canada	NR	NR	NR	School-level randomization	360	43	55.2	NR	7-8	NR
Taylor, 2007 <sup>99</sup>	N	Y	New Zealand	NR	NR	NR	NR	730	104	49.8	7.7	NR	WNH >80
Thivel, 2011 <sup>76</sup>	Y	N	France	NR	6-10	1 or 2	No more than 3 hours physical activity per day, no known disease, no other studies	457	26	52	6-10	1-2	NR
Treveno, 2005 <sup>59</sup>	Y	N	U.S.	NR	NR	4	Low income	387	34	52	9.7	NR	NR
Tucker, 2011 <sup>97</sup>	N	N	U.S.	NR	NR	NR	NR	99	34	100	9.6	4-5	NR
Valdimarsson, 2006 <sup>101</sup>	N	N	Sweden	Girls	NR	1-2	NR	103	52–104†	100	7.8	NR	NR
Vandongen, 1995 <sup>83</sup>	Y	N	Australia	NR	NR	8	NR	1,147	39	42.2	10-12	6	NR
Vizcaino, 2008 <sup>73</sup>	Y	Y	Spain	NR	NR	NR	NR	1,044	36-72	54	9.4	NR	NR
Walter, 1985 <sup>66</sup>	Y	N	U.S.	NR	NR	4	NR	1,563	52	48.6	9.1	4	Mixed (all)
Walther, 2009 <sup>52</sup>	Y	N	Germany	NR	NR	6	NR	211	52	45	11.1	6	NR
Warren, 2003 <sup>53</sup>	Y	Y	U.S.	NR	5-7	Primary school	NR	218	61-69	49	6.1	1-2	NR

AIAN = American Indian/Alaska Native; API = Asian Pacific Islander; BMI = Body Mass Index (in kg/m<sup>2</sup>); BNH = Black Non-Hispanic; BP = Blood Pressure; CVD = Cardio Vascular Disease; Maint = Maintenance; Meds = Medications; N = No; NR = Not Reported; physical activity = Physical Activity; RCT = Randomized Controlled Trials;

WNH = White Non-Hispanic; Y=Yes

\*Inclusion/exclusion criteria.

†Participant characteristics.

**Table 4. Interventions of studies based only in schools**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Amaro, 2006 <sup>72</sup>	Usual care	Kaledo: Educational board-game on Mediterranean diet with one play session per week and one PA session per week, also includes BMI screening.		X	X	
Barbeau, 2007 <sup>68</sup>	Usual care	Subjects given healthy snacks during homework time, and a PA component including skills development, MVPA, and heart rate monitors.	X		X	
Bronikowski, 2011 <sup>105</sup>	Usual care	PE teachers provided social support and reinforcement for student's self-programmed out-of-school physical activity plan. Those pupils who fulfilled the PA obligations in PA plan received a reward.			X	
Burguera, 2011 <sup>91</sup>	Despite informed consent, did not participate in the intervention	ACTYBOSS: Subjects offered two nutrition and behavioral modification workshops. Special emphasis on healthy lifestyle and self-responsibility. Opportunities to participate in PA sessions, not stated if required.		X	X	X
Bush, 1989 <sup>70</sup>	Parents only received results of screening	Subjects received nutrition, exercise, anti-smoking lessons, health screening and a "Health Passport". Health newsletters were mailed to parents throughout intervention	X	X		
Chiodera, 2008 <sup>106</sup>	No control	Aimed to professionally qualify PE in schools without changing hours dedicated per week			X	
Coleman, 2011 <sup>64</sup>	Usual care	Healthy ONES: Subjects brought unhealthy snacks from home. Subjects discouraged from unhealthy snacks by teachers and staff, including promoting healthy eating in class. More nutritious snacks and food offered at school, especially for events.	X	X		
Damon, 2005 <sup>94</sup>	Usual care	Education on diet and physical activity and increase in physical activity	X		X	X
DeBar, 2011 <sup>65</sup>	Usual care	1 hour initial training outlined the required tasks, skills, and procedures, including 30-minute trainings specific to each intervention activity. Communications intervention strategies, including public commitment opportunities for students, were intended to strengthen the impact of all HEALTHY intervention components. Themes included healthier diet, decrease sugar drinks and increase PA.		X	X	X
Donnelly, 2009 <sup>45</sup>	Usual care	A target goal of 90min/week of MVPA per child was given along with WSB to increase frequency of walking to school. Teacher training was implemented for the intervention			X	X

**Table 4. Interventions of studies based only in schools (continued)**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Foster, 2010 <sup>46</sup>	Usual care	Quantity and nutritional quality of food served in the school environment was changed. The amount of time students spent in moderate to vigorous physical activity was increased. Behavioral knowledge and skill were taught in classrooms using the FLASH program	X		X	
Fung, 2012 <sup>90</sup>	Usual care	APPLE: School health facilitators promote community gardens and healthier breakfast/lunch options. Facilitated professional development for teachers and school staff, and parent information nights. After school PA sessions promoted along with walk to school days. Weekend events, celebrations and newsletters used to promote healthy living.	X		X	
Gortmaker, 1999 <sup>56</sup>	Usual care	Planet Health: Class sessions focused on behavioral changes to promote healthy eating, MVPA, and reduce TV time.		X	X	
Graf, 2008 <sup>47</sup>	Usual care	Extra health education on nutrition, biology, self-management. PA breaks were provided in mornings.		X	X	X
Gutin, 2008 <sup>48</sup>	Regular health screening and diet/PA information included	Youths were provided healthy snacks during after-school PA sessions along with academic enrichment homework and assistance.	X		X	
Haerens, 2006 <sup>71</sup>	Usual care	Subjects received additional information on healthy living along with providing healthy snack options. For PA, a computer tailored intervention was implemented about the child's activity levels and feedback. Schools were encouraged to offer more PA opportunities. Newsletters were sent out to community and parents regarding the intervention.	X	X	X	X
Heelan, 2009 <sup>95</sup>	Usual care	Walking School Bus program. Children walk in groups along set route to school, with adult as "driver" (chaperone).			X	
Howe, 2011 <sup>57</sup>	Usual care	After school program for two hours that included; skills development, VPA, toning and stretching			X	
James, 2004 <sup>49</sup> James, 2007 <sup>54</sup>	Usual care	Discourage drinking of fizzy drinks (sweetened and unsweetened) among school-age children.		X		

**Table 4. Interventions of studies based only in schools (continued)**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Kafatos, 2005 <sup>78</sup>	Usual care	Cretan Health/Nutrition Program: Classroom modules designed to develop behavioral capability, expectations, and self-efficacy for healthy eating. Theoretical component of PA was given by PE instructor along with PA sessions. Children also kept food diary.		X	X	X
Kain, 2009 <sup>84</sup>	Usual care	Intervention included diet/nutrition lessons and additional PE sessions along with novel card game to promote healthy living.		X	X	
Klish, 2012 <sup>74</sup>	Usual care	Obese children with parents were invited to after-school behavior modification program that offered dietary instruction and behavioral therapy. Chef-in-school program: professional chef comes to the school to teach how to prepare healthy meals. New exercise equipment brought in to promote active recess time.		X	X	
Lazaar, 2007 <sup>79</sup>	Usual care	After school PA program with double objective; playful physical practice and dynamic exercise within 1 hour.			X	
Llargues, 2012 <sup>58</sup>	Usual care	IVAC method: Promoting healthy dietary habits and increasing PA through pedagogy Investigation, Vision, Action and Change intervention (IVAC)		X		
Lubans, 2012 <sup>59</sup>	Usual care	PALs: Nutritional handbooks and seminars, sport sessions, lunchtime activities and leadership sessions.		X	X	X
Lubans, 2012 <sup>60</sup>	Usual care	Nutritional handbooks and seminars, sport sessions, lunchtime activities and leadership sessions.		X	X	X
Madsen, 1993 <sup>67</sup>	No control	SCORES: Children in program pay soccer three days a week, community service and/or creative writing. Training in self-monitoring in regard to diet and sodium content along with self-monitoring for PA.		X	X	X
Magnusson, 2012 <sup>61</sup>	Usual care	Interventions were designed to increase dietary knowledge and self-efficacy. Teachers integrated PA into curriculum.		X	X	
Manios, 1999 <sup>103</sup> Manios, 2002 <sup>104</sup> Manios, 2006 <sup>100</sup>	Usual care for children, and parents received mailed envelopes with all medical screening results with brief comments	Educational sessions offered for health and nutritional components. PA component included educational sessions and increased PA with stretching, fitness stations and aerobic games.		X	X	X

**Table 4. Interventions of studies based only in schools (continued)**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Muckelbauer, 2009 <sup>55</sup>	Usual care	Intervention targeted behavioral change and education regarding diet, nutrition, and goal setting.	X	X		
Neumark-Sztainer, 2010 <sup>50</sup>	Usual care	New Moves: intervention targets increasing fruit, vegetable intake, and limiting sugar-sweetened beverages. Subjects were served healthy foods during lunch and offered more PA opportunities	X	X	X	
Newton, 2010 <sup>85</sup>	No control	School Cafeteria were modified with more healthy choices up to the state standards. Teachers were encouraged to model daily PA tips for short bouts of PA and an additional increased PE session indoors.	X	X	X	X
Reed, 2008 <sup>82</sup>	Usual care	Goal to deliver 15 min of MVPA daily for 75 extra min of PA per week in schools. Principals and teachers met with facilitators to design program. Teachers also provide classroom activities such as skipping, dancing and resistance training.			X	X
Resaland, 2011 <sup>87</sup>	Usual care	60 min of PA conducted by specialist PE teacher for 104 weeks			X	
Rosario, 2012 <sup>62</sup>	Usual care	Teachers addressed nutrition topics via classroom activities, including food, nutrition, diet guidelines, along with PA/lifestyle topics.		X		X
Rush, 2012 <sup>63</sup>	Usual care	Energizer educated through information regarding replacing sugary drinks with water and importance of eating breakfast. Canteen makeovers were conducted to remove pastries and pies, and to add healthier options. Promotion of PA sessions with games and activities.	X	X	X	X
Sahota, 2001 <sup>51</sup>	Usual care	Increase knowledge and attitudes towards healthy living, modification of school meals and PE sessions.	X	X	X	
Sallis, 1993 <sup>86</sup>	Usual care	Self-management program to promote PA outside school for children. Lessons taught skills to maintain activity habits post-intervention. Additional PE classes were provided. A brief nutrition intervention of seminars for teachers were also conducted			X	X
Salmon, 2008 <sup>80</sup>	Usual care	BM/FMS: Focused on teaching object control and locomotor skills. Reduce TV and video game time at home and involvement of parents in process.			X	X
Skybo, 2002 <sup>96</sup>	Usual care	American Heart Association Heart Power! Emphasize nutrition in class discussions as well as importance of PA. Children then engaged in PA such as jumping jacks or running in place.		X	X	X

**Table 4. Interventions of studies based only in schools (continued)**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Smolak, 2001 <sup>89</sup>	No curriculum different schools	ESEM: Encouraged parents to modify diet and PA habits at home.			X	X
Sollerhed, 2008 <sup>98</sup>	Usual care	I-school: Increased PE time in intervention school, time was expanded from one/two lessons per week to 4 lessons			X	
Stenevi-Lundgren, 2009 <sup>92</sup>	Usual care	Increase school PE time per week.			X	
Stock, 2007 <sup>88</sup>	Usual care	Themes targeted exposure to nutritional information on foods and beverages. Themes also included structured PA/aerobic fitness and lessons on healthy body image and self-esteem.		X	X	X
Taylor, 2007 <sup>99</sup>	Usual care	APPLE: Encourage healthy eating with science lessons highlighting adverse health effects of sugary drinks and fatty foods. Cooled water filters installed in schools to promote drinking water. Initiatives were set to promote more PA activity as well as sports equipment were provided for free time.	X	X	X	X
Thivel, 2011 <sup>76</sup>	Usual care	PA program of additional 2hrs of PA in addition to 2hrs of regular PE class. Objective to increase PA and minimize inactivity			X	
Trevino, 2005 <sup>69</sup>	Usual care	Beinestar Health Program: Decrease dietary fats and increase fiber intake through parent fun activities. PA promotion was also included in the activities along with a after school program with activities such as games, dancing, singing, crafts, etc.		X	X	X
Tucker, 2011 <sup>97</sup>	Let's Go 5-2-1-0 Program curriculum ONLY, without student nurse coaching, parent evening offerings, and reinforcement incentives	Let's Go: Coaching sessions designed to promote healthy eating and exercise conducted by nursing staff and parents.		X		X
Valdimarsson, 2006 <sup>101</sup>	Usual care	POP: Increase PA in schools from 60min/week to 200min/week.			X	
Vandongen, 1995 <sup>83</sup>	Usual care	Increase fruit and vegetable consumption and whole grains while also reducing consumption of fatty foods and sugar sweetened beverages with educational lessons		X		
Vandongen, 1995 <sup>83</sup>	Usual care	Classroom sessions providing rational basis for activity programs. Fitness program included relays, skipping and health hustles.			X	X

**Table 4. Interventions of studies based only in schools (continued)**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Vandongen, 1995 <sup>83</sup>	Usual care	Classroom sessions to provide rational basis for activity programs. Activity programs include; relays, skipping and health hustles. Heart rates of 150-170 beats/min were to be achieved in first 15 min. Nutrition education was provided focusing on increase fruits, vegetables, whole grains, and decrease intake of fatty foods and sugars. Homework assignments and comics were given to children to help improve healthy eating.		X	X	X
Vizcaino, 2008 <sup>73</sup>	Usual care	Activity program with sports using alternative equipment (pogo sticks, Frisbees, parachutes, etc.). Primary care providers encouraged to focus on behavioral targets for patients			X	
Walter, 1985 <sup>66</sup>	Usual care	Incorporates social learning strategies to encourage behavioral change regarding diet and PA (improvement of cardiovascular fitness)		X		X
Walther, 2009 <sup>52</sup>	Mandatory 2 units (45 mins.) of PE classes/week plus healthy lifestyle lessons/month	45 min of PA with 15 min endurance training per school day. Non-randomized sport students received 12 units (45min) of high-level endurance exercise per week.			X	
Warren, 2003 <sup>53</sup>	Be smart; educational program about food in non-nutrition sense.	Eat Smart Educational Intervention: emphasizing food contributing to health and healthy food. Lessons were given in PA education and television viewing.		X		X

Phys/Env=Physical/environmental intervention; Psych = psychosocial intervention



## Outcomes

### Diet Interventions

We identified two RCTs, described in three articles.<sup>49,54,83</sup>

### Weight-Related Outcomes

#### BMI z-Score

One study reported on BMI z-score showing a significant decrease of it at final followup at 158 weeks (mean difference=0.24; 95% CI: 0.02 to .46; p=0.03)<sup>49,54</sup> (Appendix E, Evidence Table 4a).

#### BMI

Both of the diet intervention studies reported on BMI as an outcome. One study looked at the entire population and showed significant changes in BMI in favor of the intervention group at 158 weeks (mean difference =0.68; 95% CI: 0.06 to 1.30; p=0.03).<sup>49,54</sup> One study reported on a subgroup analyses by sex. The results showed a nonsignificant change in favor of the control for boys, and nonsignificant change in favor of the intervention for girls (Appendix E, Evidence Table 4a,b).<sup>83</sup>

#### Prevalence of Overweight and Obesity

One study reported on prevalence of obesity and overweight, but found no statistical significance intervention effect.<sup>49,54</sup> The study reported prevalence of overweight and obesity in subgroups of boys and girls and found no intervention effect (Appendix E, Evidence Table 4a,b).<sup>49,54</sup>

#### Percent Body Fat

One study reported percent body fat change in subgroups of boys and girls. In both subgroups there was no intervention effect (Appendix E, Evidence Table 4b).<sup>83</sup>

#### Waist Circumference

One study reported on waist circumference.<sup>54</sup> This study showed a change in waist circumference in favor of the intervention, but it was not significant (Appendix E, Evidence Table 4a).

#### Skinfold Thickness

One study reported on skinfold thickness in subgroups by sex. The changes in triceps skinfold thickness in boys favored the control and for girls, favored the intervention. Neither difference was significant.<sup>83</sup> The change in subscapular skinfold thickness favored the control for both the boys and girls. Neither difference was significant (Appendix E, Evidence Table 4b).<sup>83</sup>

### Clinical Outcomes

One study reported on systolic and diastolic blood pressure in boys and girls subgroups. Both controls and interventions decreased for these two outcomes, the differences between the interventions and controls was not significant except in the case of diastolic blood pressure in girls where the difference in decrease was significantly in favor of the intervention (numbers not reported).<sup>83</sup> This study also reported on total cholesterol in boys and girls and found that total

cholesterol was significantly higher in the intervention groups of both the boys and the girls (numbers not reported) (Appendix E, Evidence Table 4c).<sup>83</sup>

## **Adverse Events**

The research did not report any.

## **Intermediate Outcomes**

### **Dietary Intake**

One study examined the change in energy intake using a number of parameters.<sup>83</sup> The percent of energy from sugar decreased significantly in boys, but did not in girls. The percent of energy from total fat increased in the intervention groups relative to the control groups, but was not significant for either boys or girls. For percent of energy intake as saturated fat, the intervention had no effect on boys, but there was a nonsignificant decrease in the intervention girls. Overall energy intake (MJ/d) did not differ between the intervention and control groups for both the boys and girls (Appendix E, Evidence Table 4d).

One study recorded change in carbonated beverage consumption but the differences between groups were not significant (Appendix E, Evidence Table 4d).<sup>49</sup>

### **Interpretation**

The results from an outcome measure from each of the two studies reporting on dietary interventions support our conclusions. One reported on BMI z-score.<sup>54</sup> This study showed a significant decrease in BMI z-score at 3 years. The other study reported on BMI, and showed a nonsignificant change in favor of the intervention in boy and girl subgroups at nine months.<sup>83</sup> Based on this evidence we conclude that dietary interventions positively impact BMI z-score and BMI outcomes. One of these dietary intervention studies has a goal of obesity prevention.<sup>49,54</sup> Both studies focused on education that promoted a healthy diet, and reduced the consumption of carbonated drinks.

## **Physical Activity Interventions**

Fifteen studies reported on the effects of physical activity interventions on weight-related outcomes.<sup>45,52,73,76,79,80,82,83,86,87,89,92,95,101,106</sup>

## **Weight-Related Outcomes**

### **BMI z-Score**

Two studies reported on BMI z-score and found a difference in BMI in the intervention group compared with control groups.<sup>79,95</sup> One study reported a reduction in BMI z-score in favor of the intervention that was not significant.<sup>95</sup> The other study reported reductions in BMI z-score in both boys and girls stratified by obese and non-obese, but these reductions were not significant (Appendix E, Evidence Table 5a,b).<sup>79</sup>.

### **BMI**

Six studies reported on BMI in the whole population.<sup>45,52,82,87,92,95</sup> None of these studies found a statistically significant intervention effect. One study showed a nonsignificant reduction in BMI in favor of the intervention group,<sup>52</sup> and two studies showed no difference in BMI between the control and intervention (Appendix E, Evidence Table 5a,b).<sup>45,87</sup>

Nine studies reported on BMI by subgroup. Seven of these studies reported boy and girl subgroups. Six studies reported nonsignificant BMI change in favor of the intervention in boys,<sup>79,83,86,87,89,106</sup> and five studies reported nonsignificant BMI change in favor of the intervention in girls.<sup>79,83,87,106,107</sup> One study reported on BMI change in favor of the control group in boys,<sup>108</sup> and another study reported the same in girls.<sup>86</sup> One study reported a null affect in girls.<sup>108</sup> Another study showed significant changes in BMI in favor of the intervention girls (-0.15; 95% CI: -0.31 to -0.0; p<0.05).<sup>80</sup>

One study reported BMI outcomes by obese and normal weight subgroups, the change was in favor of the intervention, but was not significant in both groups.<sup>76</sup> One study reported on BMI by grade and reported a nonsignificant BMI change in favor of the intervention in most grades (Appendix E, Evidence Table 5a,b).<sup>106</sup>

### **BMI Percentile**

One study reported on BMI percentiles.<sup>95</sup> This study showed a nonsignificant reduction in BMI percentile in favor of the intervention. (Appendix E, Evidence Table 5a).

### **Prevalence of Overweight and Obesity**

Two studies reported on the prevalence of overweight. One study showed a large decrease in obesity prevalence over time, but the significance was not reported in the paper.<sup>52</sup> One study reported on a subgroups of boys and girls, stratified into obese and non-obese groups, with a nonsignificant reduction in the prevalence of overweight among girls and boys in favor of the intervention (Appendix E, Evidence Table 5a,b).<sup>79</sup>

### **Percent Body Fat**

Three studies reported on percent body fat as an outcome in the whole population.<sup>95,101,106</sup> One study showed an increase in body fat in both the intervention and control, but the change was in favor of the control group and was not significant.<sup>92</sup> A second study suggested that the change in percent body fat favors the intervention group, but was not significant.<sup>95</sup> The third study included reported a significant increase in body fat in the intervention group (mean difference =0.9+/- 1.5; p> 0.001).<sup>101</sup> One study reported on percent body fat in boy and girl subgroups. Both subgroups reported changes in favor of the intervention, but they were not significant (Appendix E, Evidence Table 5a,b).<sup>73,83</sup>

### **Waist Circumference**

Two studies reported on waist circumference. One study evaluated the entire population and found a smaller increase in the intervention groups when compared to the control groups.<sup>87</sup> These differences were not significant. A third study evaluated the effect of physical activity on subgroups of boys and girls.<sup>79</sup> This study reported a decrease in two of the intervention groups in boys, but the differences were not significantly different than those seen in the control group. This study did show a significant decrease in waist circumference in the subgroup of obese girls in favor of the intervention (mean difference in difference=0.43 cm; p<0.001). (Appendix E, Evidence Table 5a).<sup>79</sup>

### **Skinfold Thickness**

Two studies measured triceps skinfold thickness. One found a significant difference in triceps skinfold thickness in a subgroup analyses by BMI between the 25<sup>th</sup> and 75<sup>th</sup> percentile in favor of the intervention group, (mean difference in differences=-1.25; 95% CI: -1.82 to -0.67;  $p<0.001$ ) at 52 weeks, but no significant change at 104 weeks.<sup>73</sup> Another found a change in favor of the control for boys and a change in favor of the intervention for girls. Neither of these differences was significant.<sup>83</sup> This same study also reported on subscapular skinfold thickness in the two subgroups and found changes in favor of the intervention, The changes were not significant for either subgroup (Appendix E, Evidence Table 5a,b).<sup>83</sup>

### **Weight**

Three studies reported on weight change. Two studies reported on the entire population and both measured an increase in weight in favor of the control group; increases were not significant in either study.<sup>87,92</sup> Two studies reported on boy and girl subgroups. One study reported no significant change in weight in girls after 104 weeks, however the girls in the intervention group did gain more at the final time point.<sup>108</sup> In the other study reporting on boy and girl subgroups, boys in the intervention group gained less weight at 104 weeks, and girls in the intervention group gained more.<sup>87</sup> The differences were not significant in either subgroup. One study reported on overweight and normal weight subgroups.<sup>76</sup> The normal weight intervention group gained less weight at 26 weeks, and the overweight intervention group gained slightly more at 26 weeks; these changes were not significant (Appendix E, Evidence Table 5a,b).

### **Clinical Outcomes**

Three studies reported on clinical outcomes in the whole population. Two studies reported on systolic and diastolic blood pressure.<sup>82,87</sup> One study found a significant difference in the systolic blood pressures of children in the intervention group compared with control group ( $p<0.05$  at 39 weeks) but only an nonsignificant decrease in diastolic blood pressure.<sup>82</sup> The other study reported decreases in both systolic and diastolic blood pressure in favor of the intervention that were nonsignificant.<sup>87</sup> One study reported on High-density lipoprotein (HDL) and Low-density lipoprotein (LDL) and reported decreases in both in favor of the intervention that were nonsignificant.<sup>52</sup> Another study reported on LDL, and reported a decrease in favor of the intervention that was not significant.<sup>82</sup> This study also reported on the ration of HLD to LDL and reported a decrease in favor of the intervention that was not significant. Three studies reported total cholesterol. Two studies reported a decrease in favor of the intervention,<sup>82,87</sup> and the third reported a slight decrease in favor of the control which was not significant.<sup>52</sup> Two studies reported changes in triglycerides and reported slight decreases in favor of the intervention, but the decreases were not significant.<sup>52,87</sup> One study reported on clinical outcomes in boy and girl subgroups.<sup>83</sup> The study measured systolic and diastolic blood pressure and total cholesterol. For all of these outcomes, the change in the boys favored the control and were not statistically significant. For the blood pressure outcomes in girls, both favored the intervention and the change in diastolic blood pressure was significantly in favor of the intervention (the paper did not report the p value). Differences in total cholesterol in girls favored the control but differences were nonsignificant (Appendix E, Evidence Table 5c).<sup>83</sup>

### **Adverse Events**

The research did not report any.

## Intermediate Outcomes

### Physical Activity and Sedentary Behavior

Three studies reported on change in physical activity or sedentary activity. One study reported on reduction of sedentary activity (TV viewing time).<sup>80</sup> This study reported significantly less TV viewing in the intervention group when compared to the control ( $p < 0.05$ ). The three studies measured the change in physical activity in a variety of ways. One study measured daily physical activity using an accelerometer and found a significant increase ( $p > 0.05$ ) in the intervention group when compared to the control.<sup>45</sup> Another study measured change in physical activity in hours per week and found that the intervention group spent significantly more time per week ( $p > 0.05$ ) involved in physical activity than did the control group.<sup>92</sup> This same study looked at participation in organized sports and found that the intervention group spent significantly more time engaged in organized sports ( $p < 0.05$ ) than the control group.<sup>92</sup> One study measured the amount of time spent engaged in moderate activity, and amount of time engaged in vigorous activity.<sup>80</sup> Moderate physical activity increased significantly ( $p < 0.01$ ) in boys engaged in behavior modification and in girls ( $p < 0.05$ ) engaged in movement skills training.<sup>80</sup> Vigorous activity increased significantly in both boys and girls in the intervention groups when compared to no intervention.<sup>80</sup> This same study found that the intervention groups spent significantly less time ( $p < 0.05$ ) watching TV than the control group (Appendix E, Evidence Table 5d).

### Interpretation

The results from an outcome measure from each of the 15 studies reporting on physical activity interventions support our conclusions. Two studies reported on BMI z-score.<sup>79,95</sup> Both reported changes in BMI z-score in favor of the intervention. One study did not report on significance,<sup>95</sup> and the other reported a nonsignificant change.<sup>79</sup> Eleven studies reported on BMI.<sup>45,52,76,80,82,83,86,87,89,92,106</sup> Eight of these reported a change in BMI in favor of the intervention. One of these were significant,<sup>80</sup> and the remaining had either nonsignificant changes, or did not report on significance.<sup>52,76,82,87,92,109</sup> A single study reported on change in percent body fat and reported a significant change in favor of the control (no intervention).<sup>101</sup> A single study reported on skinfold thickness fat and reported a significant change in favor of the control (no intervention).<sup>73</sup> Based on this evidence we conclude that physical activity interventions positively impact BMI z-score and BMI. Based on this evidence we cannot conclude that physical activity interventions positively impact skinfold thickness and percent body fat.

One study that showed a significant effect on percent body fat<sup>101</sup> enrolled pre-pubertal girls and focused on daily physical educational classes led by school teachers. A major strength of this study<sup>101</sup> is that we could regard the intervention group as a population-based cohort, since the study invited all girls in grades 1 and 2 in one school enrolled 90 percent.

One study reported on the influence of gender on the magnitude of the changes in anthropometric variables<sup>79</sup> and found a significant reduction in waist circumference of girls but no effect in boys. Plausible explanations for this sex-difference may be that girls are basically less physically active compared to boys; adding daily physical activity into girls' daily routine might have produced a substantial effect on their energy expenditure. Additionally, the post-exercise eating behavior may have been different according to gender.

Some of the physical activity interventions also had impact on clinical outcomes (e.g., systolic blood pressure),<sup>82</sup> and intermediate outcomes (e.g., increasing physical activity and reducing sedentary activities). These studies targeted cardiovascular disease risk profiles<sup>82</sup> and

promoted daily physical activity in elementary-school children<sup>45,80,92</sup>. All of these factors may have contributed to the significant effects of the interventions on weight and other outcomes.

There were no clear differences between the studies that were effective at preventing obesity and those that were not.

## **Diet and Physical Activity Intervention**

Thirty-seven studies in 39 articles assessed the effect of a combined diet and physical activity intervention on weight-related outcomes.<sup>47,48,50,51,53,55-72,74,78,83-85,88,90,91,94,96-98,100,103-105</sup>

## **Weight-Related Outcomes**

### **BMI z-Score**

Eleven studies reported on BMI z-score. Seven of these studies reported on BMI z-score in the entire population. Five of these studies reported no significant difference between the intervention and control. Four of these reported increases in BMI z-score in both the intervention and the control but the change favored the intervention.<sup>55,62,72,99</sup> A single study reported no statistics but stated that the difference between the control and intervention was not significant.<sup>51</sup> Another was a pre-post study that reported no statistical change between groups.<sup>85</sup> Two combined diet and physical activity intervention studies that evaluated BMI z-score as an outcome reported a statistically significant change in BMI z-score in favor of the intervention group compared to the control group: mean difference in differences 0.04,  $p=0.04$ <sup>46</sup>; mean difference in differences -0.08 (95% CI: -0.02 to 0.04).<sup>60</sup> Four studies that reported on entire populations and BMI z-score were RCTs and included sufficient data and homogeneity for a meta-analysis.<sup>46,55,60,62,72</sup> This analysis showed an overall difference in BMI z-score of -0.08 (95% CI -0.14, -0.02,  $p=0.009$ ), in favor of the intervention (Figure 3; Appendix E. Evidence Table 6a).

Two studies reporting on BMI z-score also reported data by sex subgroups.<sup>71,84</sup> Both studies reported changes in BMI z-score in favor of the intervention. In one study the changes were significant in favor of the intervention for both subgroups;  $p<0.05$  for both girls and boys.<sup>84</sup> The other study found only significant changes in favor of the intervention in girls,  $p<0.05$ .<sup>71</sup> (Appendix E. Evidence Table 6b).

### **BMI**

Twenty-one studies, described in 22 articles, reported on BMI. Sixteen of them reported on BMI in the entire population. Seven studies reported no significant intervention effect.<sup>50,57,65,67,91,94,99</sup> Four showed change in BMI in the direction in favor of the intervention,<sup>57,61,65,67,91,99</sup> and one showed no effect in overweight children only.<sup>94</sup> Eight of these studies, described in 11 articles, reported a statistically significant desirable effect on BMI; reported in article with no statistics<sup>48</sup>; adjusted change = -0.45 (95% CI: -0.79 to -0.12);  $p=0.008$ ; <sup>68</sup>; mean difference in difference at 10 years = 0.62;  $p=0.014$ <sup>100,103,104</sup>; mean difference in differences = -2;  $p=0.98$ ; 0.7 kg/m<sup>2</sup> (s.e. 0.28) difference in differences between groups at 4 years;  $p=0.019$ <sup>78</sup>; adjusted difference in change = -0.019 (95% CI: -0.70 to 0.33)<sup>60</sup>; mean difference in difference = 0.8;  $p<0.001$ <sup>58</sup> However, One study reported a statistically significant change in BMI in favor of the control mean adjusted difference = 0.7;  $p<0.001$ .<sup>47</sup>

Seven of the studies showing a statistically significant effect were RCTs and included sufficient data for further analysis.<sup>50,57,58,60,61,68,110</sup> These studies showed an overall mean

difference of -0.32 kg/m<sup>2</sup> (95% CI: -0.49, -0.16, p<0.001) in favor of intervention (Figure 4; Appendix E. Evidence Table 6a).

Nine studies reporting on BMI also reported data by subgroups. Six by sex,<sup>69,71,78,83,84,105</sup> two by weight status,<sup>47,94</sup> and one by grade.<sup>88</sup> In six of the seven studies, all of the subgroup analyses by sex showed change in BMI in favor of the intervention. One study<sup>105</sup> reported a nonsignificant change in favor of the control, and the other<sup>71</sup> reported a nonsignificant change in BMI in favor of the intervention in girls and a significant change in favor of the intervention in boys (p-value not specified). The studies reporting on weight status subgroups (obese, overweight, underweight, and normal weight) did not report on significance in differences across groups. One found changes in favor of the control in obese, overweight, and normal weight groups, and changes in BMI in favor of the intervention in the underweight group.<sup>47</sup> A study describing grade subgroups reported changes in favor of the intervention, for grades k-3, and a significant difference for grades 4–7; mean difference in differences 0.3, p=0.008 (Appendix E. Evidence Table 6b).<sup>88</sup>

### **Prevalence of Overweight and Obesity**

Eleven studies reported on the prevalence of overweight and obesity. They reported prevalence in one of three ways: prevalence of overweight and obesity, prevalence of obesity, or prevalence of overweight. Four studies reported overweight and obesity prevalence in total populations. Two reported a nonsignificant change in favor of the intervention,<sup>46,58</sup> and another reported a nonsignificant difference in favor of the control.<sup>64</sup> The fourth reported a significant difference in prevalence of overweight/obesity in favor of the intervention; mean difference in differences = 0.31, p=0.04.<sup>55</sup> Five studies reported on the prevalence of obesity in the entire population. All showed a nonsignificant change in obesity prevalence in favor of the intervention.<sup>46,53,62,74,90</sup> Three studies reported on the prevalence of overweight in total populations. One study reported a nonsignificant change in favor of the control,<sup>64</sup> A pre-post study reported no difference,<sup>53</sup> On study, after controlling for confounders, the predicted odds of incidence was 75% lower for the intervention group (odds ratio [OR]: 0.25; 95% CI: 0.07–0.92; p < 0.05) (Appendix E. Evidence Table 6a).<sup>62</sup>

Four studies reported outcomes by sex subgroups. One study reported on prevalence of overweight/obese and found a nonsignificant change in prevalence in favor of the intervention in both boys and girls.<sup>58</sup> Two studies reported on the prevalence of obesity. One study reported a nonsignificant change in prevalence in favor of the intervention for boys, and a significant change in favor of the control for girls; OR, 0.47; 95% CI, 0.24-0.93; p= .03.<sup>56</sup> The other found a significant change in prevalence in favor of the intervention for boys (17.0% to 11.4% vs. 21.6% to 19.7 %, p<0.05) and a nonsignificant change in prevalence in favor of the intervention for girls.<sup>84</sup> One study reported on the prevalence of overweight and showed a nonsignificant change in favor of the intervention for girls and a nonsignificant change in favor of the control for boys (Appendix E, Evidence Table 6b).<sup>78</sup>

### **Percent Body Fat**

Nine studies reported on percentage body fat. They recorded in three ways: percent body fat, percent lean mass, and percent muscle. Six studies reported on percent body fat in the entire population. Three of these studies reported nonsignificant change in body fat in favor of the intervention,<sup>50,61,85</sup> and one showed no significant difference between the intervention and control groups.<sup>96</sup> Two studies reported significant changes in favor of the intervention; adjusted

change = -2.01; 95% CI: 2.98 to 1.04;  $p=0.0001$ ,<sup>68</sup> and  $p<0.05$ .<sup>48</sup> One study measured lean mass and reported a nonsignificant change in favor of the control.<sup>61</sup> (Appendix E. Evidence Table 6a).

Four studies presented subgroup results. One study only included girls, and found a nonsignificant change in percent body fat in favor of the intervention.<sup>60</sup> Another reported on percent body fat by age subgroups and found nonsignificant changes in percent body fat in favor of the control group for both 5 to 7 year olds and 10 to 12 year olds.<sup>63</sup> Attendance had a nonsignificant influence on percent body fat in favor of the intervention in one study.<sup>48</sup> One study measured lean muscle mass in boys and girls and there was a significant change in favor of the intervention for boys ( $p<0.05$ ) and nonsignificant change in favor of the control for girls (Appendix E. Evidence Table 6b).<sup>105</sup>

### **Waist Circumference**

Six studies reported on waist circumference change in the entire population. Five studies reported nonsignificant changes in waist circumference in favor of the intervention.<sup>57,61,68,98,99</sup> One study reported a significant reduction in waist circumference > the 90<sup>th</sup> percentile ( $p=0.03$ ) and the same study reported a nonsignificant change in waist circumference in favor of the intervention (Appendix E. Evidence Table 6a).<sup>46</sup>

One study reported on waist circumference based on attendance and found a nonsignificant change in favor of the control.<sup>48</sup> Another study reported on sex subgroups and found significant changes in waist circumference in favor of the intervention group for both boys ( $p<0.05$ ) and girls ( $p<0.05$ ) (Appendix E. Evidence Table 6b).<sup>84</sup>

### **Skinfold Thickness**

Studies reported skinfold thickness in two ways: triceps skinfold thickness, and the sum of four skinfold thickness measures. One study reported triceps skinfold thickness for the entire population and showed nonsignificant changes in favor of the intervention.<sup>70</sup> One study reported the sum of four skin fold measures for the entire population and showed a nonsignificant change in favor of the control group (Appendix E. Evidence Table 6a).<sup>61</sup>

Two studies reported on skinfold outcomes in sex subgroups. One study reported on triceps skinfold thickness and showed significant changes in favor of the control in both boys ( $p<0.05$ ) and girls ( $p<0.05$ ).<sup>84</sup> Another study reported on the sum of four skinfold measures and found a nonsignificant change in favor of the control in boys and a nonsignificant change in favor of the intervention for girls (Appendix E. Evidence Table 6b).<sup>105</sup>

### **Weight**

Three studies reported on weight change in the entire population. These studies showed changes in weight in favor of the control. These changes were not significant in two studies,<sup>99,103</sup> and the changes were significant in the other ( $p<0.05$ ) (Appendix E. Evidence Table 6a).<sup>96</sup>

Three studies reported on weight change in subgroups, two by sex subgroups and one by grade. One study reported nonsignificant changes in weight in favor of the intervention for both boys and girls,<sup>105</sup> and the other showed nonsignificant changes in favor of the intervention for boys and nonsignificant changes in favor of the control for girls.<sup>71</sup> The third study reporting on grade subgroups reported nonsignificant changes in favor of the intervention in grades K-3 and nonsignificant changes in favor of the control for grades 4-7 (Appendix E. Evidence Table 6b).<sup>102</sup>



## Clinical Outcomes

Seven studies reported on clinical outcomes. Five studies reported on change in systolic and diastolic blood pressure. One study reported a statistically significant change in both blood pressure measures in favor of the control ( $p < 0.001$  for both). Three of the remaining four studies reported nonsignificant changes in both blood pressure measures in favor of the intervention.<sup>48,67,96</sup> A single study reported a change in systolic blood pressure in favor of the intervention and a change in diastolic blood pressure in favor of the control.<sup>91</sup> An additional study reported on systolic and diastolic blood pressure SDS in 5 to 7 year olds, and 10 to 12 year olds. The study reported no significant difference in either measure in both groups.<sup>63</sup>

Six studies reported on metabolic measures. Three studies reported on HDL. One reported nonsignificant change in favor of the control.<sup>48</sup> Two studies reported significant changes in favor of the control,  $p > 0.001$ <sup>70</sup>, and  $p = 0.014$ <sup>100</sup> Two studies reported on LDL changes. Both reported changes in favor of the intervention, one nonsignificant,<sup>67</sup> and the other significant ( $p < 0.001$ )<sup>100</sup> Five studies reported total cholesterol. Three of these reported nonsignificant changes in favor of the control.<sup>67,70,96</sup> Two reported nonsignificant changes in favor of the intervention.<sup>48,104</sup> One reported significant changes in favor of the intervention ( $p < 0.001$ ).<sup>100</sup> A single study reported on triglycerides and showed nonsignificant changes (Appendix E. Evidence Table 6c).<sup>100</sup>

## Adverse Events

One study<sup>110</sup> reported on musculoskeletal injury and used a combined intervention of diet and physical activity in a school-based setting. In year 1, there were 24 adverse events. Overall, there were 0.0006 adverse events per program hour (or incident rate 0.06 per student). Another study reported that at least one adverse event was reported by 2.4 percent of students at baseline, and 1.7 percent of students at the end of the study with no significant difference between the intervention and control groups.(Appendix E. Evidence Table 6d).<sup>46</sup>

## Intermediate Outcomes

### Physical Activity and Sedentary Behavior

Three studies measured changes in hours spent weekly in physical activity. Two studies showed no significant intervention effect.<sup>51,72</sup> Another study measured differences in the amount of physical activity based on where the physical activity took place.<sup>101</sup> In this study there was a significant difference in the weekly hours spent doing physical activity in favor of the intervention ( $p < 0.001$ ) inside of school, a significant difference in the weekly hours spent doing physical activity in favor of the intervention ( $p < 0.05$ ) outside of school, and a significant difference in the weekly hours spent doing physical activity in favor of the intervention ( $p < 0.001$ ) both in and outside of school.<sup>101</sup>

One study measured physical activity in 30 minute blocks per day and found the overall change in the amount of physical activity was not significantly different in favor of the control for groups engaged in moderate to physical activity.<sup>50</sup>

Seven studies, described in eight articles, measured changes in moderate to vigorous physical activity in hours per day.<sup>56,57,60,68,75,81,100,104</sup> Two of these showed significant increases in physical activity favoring the intervention,  $p = 0.006$ ,<sup>68</sup>  $p = 0.04$ .<sup>57</sup> Another study reported significant change in physical activity in favor of the control at 6 years,  $p < 0.05$ <sup>104</sup> and 10 years,  $p = 0.038$ .<sup>100</sup> Three studies measured the change in vigorous physical activity and found no intervention effect.<sup>60,68,81</sup> A single study measured a physical activity index measured as sedentary activity, low activity,

moderate activity, and vigorous activity.<sup>62</sup> All of these measures changed in favor of the intervention, but the changes were not significant.

One study measured the percentage of participants who ran in the morning or afternoon and found no difference between groups.<sup>53</sup> This study also found no difference in playground activity between groups. One study reported the prevalence of active commuting over time and found a significant increase in favor of the intervention.<sup>95</sup>

A study measured daily physical activity via accelerometer and found significant increases in the intervention group over time ( $p < 0.050$ ).<sup>95</sup> Another study measured leisure time physical activity and found a significant increase in the intervention group ( $p = 0.0005$ ).<sup>103</sup>

Two studies measured sedentary activity, neither found a significant difference between the intervention and control groups, but did show change in favor of the intervention.<sup>50,62</sup> We did not conduct meta-analyses on intermediate outcomes (Appendix E, Evidence Table 6e).

## **Dietary Intake**

Five studies reported on the change in energy intake (e.g., caloric intake, J/day), and four reported a change in the total population in favor of the intervention, but it was not significant.<sup>56,60,62,90</sup> One study, reporting on the whole population, showed a significant change in energy intake in favor of the intervention ( $p < 0.05$ ).<sup>104</sup> One study, reporting on sex subgroups, showed a change in energy intake in favor of the intervention in boys ( $p < 0.05$ ), but not in girls ( $p > 0.05$ ).<sup>56</sup>

Seven articles described five studies measured change in the consumption of food high in fat. Four of these studies reported data on the total population and three of these studies showed no difference in consumption between the intervention and control,<sup>51,97</sup> one reported a nonsignificant change in favor of the intervention,<sup>70</sup> one reported a nonsignificant change in favor of the control.<sup>70</sup> A single study did show a significant difference in favor of the intervention at 6 years,  $p < 0.05$ .<sup>104</sup> One study reported on sex subgroups and found nonsignificant changes in favor of the intervention.<sup>56</sup> One of these studies also measured the recall of fatty food intake but found no differences between groups.<sup>51</sup> One paper measured energy from saturated fat and found no difference between the intervention and control (Appendix E, Evidence Table 6e).<sup>70</sup>

Eight studies reported on changes in fruit and vegetable intake. Two studies reported on change in vegetable intake. One did not find significant differences between intervention and control,<sup>72</sup> and the second showed a nonsignificant change in favor of the control.<sup>53</sup> A single study measured fruit intake only and found a significant increase in intake in boys ( $< 0.05$ ).<sup>53</sup> Five studies measured fruit and vegetable intake. Four of these looked at fruit and vegetable intake in the whole population. Two studies reported a nonsignificant change in intake in favor of the intervention,<sup>50,65</sup> one reported a nonsignificant change in favor of the control.<sup>90</sup> Two studies reported significant changes, both in favor of the intervention ( $p = 0.003$ ),<sup>56</sup> and ( $p < 0.05$ ).<sup>53</sup> One study found a significant increase among girls in the intervention group ( $p = 0.003$ ),<sup>56</sup> but not in boys.

Six studies reported on sugar-sweetened beverage consumption. None showed a statistically significant change in consumption, but two studies showed a change in the direction in favor of the intervention.<sup>50,95</sup>

A single study<sup>58</sup> reported multiple measures of change in dietary intake. None of these changed significantly in this study. One study reported on change in consumption of unfavorable foods.<sup>94</sup> The intervention group showed a significant change in favor of the intervention ( $p = 0.002$ ) (Appendix E, Evidence Table 6e).

## Interpretation

The results from an outcome measure from each of the 37 studies reporting on combination diet and physical activity interventions support our conclusions. Ten studies reported on BMI z-scores.<sup>51,55,59,62,71,72,84,85,99</sup> Seven of these reported changes in BMI z-score in favor of the intervention,<sup>55,59,62,71,72,84,99</sup> with four of these reporting statistically significant changes.<sup>62,71,84,99</sup> Seventeen studies (described in 19 articles) reported on BMI.<sup>47,48,50,57,58,61,65,67-69,83,88,91,98,100,103-105,111</sup> Eleven of these studies reported a change in BMI in favor of the intervention,<sup>48,50,57,58,65,68,88,98,100,103,104,111</sup> with five of these reporting statistical significance.<sup>68,88,98,100,103,104,111</sup> Five studies reported on change in the prevalence in obesity or overweight.<sup>53,56,64,74,90</sup> Only one of these studies showed a change in prevalence over time in favor of the intervention, and the change was not significant.<sup>90</sup> Two studies reported on percentage body fat.<sup>63,96</sup> Neither of these studies reported a change in percentage body fat in favor of the intervention. Two studies reported on skinfold thickness.<sup>66,70</sup> Neither of these studies reported a change in skinfold thickness in favor of the intervention. Based on this evidence we conclude that combined diet and physical activity interventions positively impact BMI z-score and BMI. In addition to this evidence, two meta-analyses of smaller sets of studies showed significant changes in favor of the intervention for both BMI and BMI a-score ( $p < 0.001$  for both outcomes). Based on this evidence we cannot conclude that combined diet and physical activity interventions positively impact prevalence of overweight and obesity, percentage body fat, and skinfold thickness.

Some diet and physical activity combined interventions appear to be effective at reducing BMI, BMI z-score, prevalence of obesity and overweight, percent body fat, waist circumference, and skinfold thickness. Often these studies specifically targeted obesity prevention and included intensive classroom physical activity lessons led by trained teachers, moderate to vigorous physical activity sessions, nutritional education materials, and healthy diet promotion and provision. The intervention studies that had significant impact took place over a duration of 52 to 156 weeks. All of these factors may have contributed to the significant effect of the intervention on weight outcomes because a more intensive implementation of the program could have a more positive influence on the anthropometric data.

The results from these studies also suggest that schools have the opportunity to raise the physical performance of children through a higher number of physical education lessons per week.<sup>57,68,95,100,103,104</sup> Children who followed long-term intervention program<sup>57,68,95,100,103,104</sup> showed significant positive changes in physical performance, whereas children in studies of shorter intervention duration had nonsignificant results. Similarly, there were significant effects of the interventions on energy intake,<sup>56,104</sup> reduced consumption of sweetened beverages,<sup>95,112</sup> and increased fruit and vegetable intake<sup>53,56</sup>. Overall these results indicate intervention components and intervention dose are critical to the impact of interventions on all outcomes. Long-term intervention duration and long-term followup are vital. Future studies of this type should be of sufficient duration to enable changes in anthropometry and other secondary outcomes.

Combination diet and physical activity interventions that included psychosocial aspects to the interventions had a significant impact on obesity-prevention outcomes.<sup>62,113</sup> Otherwise the studies included here were very heterogeneous, and no distinct difference between effective and non-effective studies can be seen.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of evidence is moderate that school-only based dietary or physical activity interventions prevent obesity or overweight in children. For both interventions the majority of studies had a moderate risk of bias and consistent direction of effect in favor of the intervention. The strength of evidence is insufficient that school-only based combination diet and physical activity interventions prevent obesity or overweight in children. We identified two low risk of bias studies and used them to evaluate the strength of evidence. These studies were inconsistent; one showed a positive effect in favor of the intervention and the other showed no effect. Additionally, the studies were imprecise (Table 5; Appendix F, Strength of Evidence Table 1).

### **Intermediate Outcomes**

We graded multiple intermediate outcomes. The strength of evidence that diet interventions impacted energy intake (measured as change in kcal, mJ, or J per day) was insufficient. One moderate risk of bias study demonstrated no intervention effect. There was insufficient evidence that physical activity impacted energy intake since no studies reported on this outcome. The strength of evidence that combination interventions impacted change in energy intake was low. Sixty percent of the studies had a moderate risk of bias and 40 percent had a low risk of bias. While all showed a favorable impact of the intervention on the outcome, the poor risk of bias scores and low precision reduced the strength of evidence.

One diet intervention study measured change in fatty food intake. This study had a moderate risk of bias, and reported only on subgroups. A nonsignificant positive impact of the intervention in favor of the intervention was seen in girls and a significant difference was shown in favor of the boys. The lack of precision and consistency between the groups led to an insufficient grade. There was insufficient evidence that physical activity impacted fatty food intake since no studies reported on this outcome. There was a moderate strength of evidence that combination interventions positively impact this outcome in favor of the intervention; 80 percent of the studies were of a moderate risk of bias and all demonstrated an effect in favor of the intervention.

There was insufficient evidence that either diet or physical activity interventions changed fruit and vegetable intake since no studies reported on this outcome. There was moderate strength of evidence that combination outcomes positively impact fruit and vegetable intake. Most of the studies had a moderate risk of bias, and over 70 percent showed an impact in favor of the intervention.

There was insufficient evidence that either diet-only or physical activity-only interventions impacted change in sugar-sweetened intake since no studies reported on this outcome. There was moderate strength of evidence that combination outcomes positively impact sugar-sweetened beverage intake. Most of the studies had a moderate risk of bias, and all of them showed an impact in favor of the intervention.

There was insufficient evidence that diet-only interventions impacted change in physical activity since no studies reported on this outcome. Physical activity interventions have a moderate strength of evidence that the intervention positively impacts the outcome. All of these studies had a moderate risk of bias, all showed an impact in favor of the intervention, and they were precise. Combination interventions have a moderate strength of evidence that the

intervention positively impacted the intervention. All of the studies had a moderate risk of bias and over 70 percent showed an impact in favor of the intervention.

There was insufficient evidence that diet or physical activity interventions impacted change in sedentary activity since no studies reported on this outcome. The single physical activity study had a moderate risk of bias with a significant change in favor of the intervention, but the study was too small (n=233) to make a conclusion. The strength of the evidence that combination interventions impact this outcome is low. All studies had a moderate risk of bias, but the direction of effect was inconsistent and there was low precision (Appendix F, Strength of Evidence Tables 2–7).

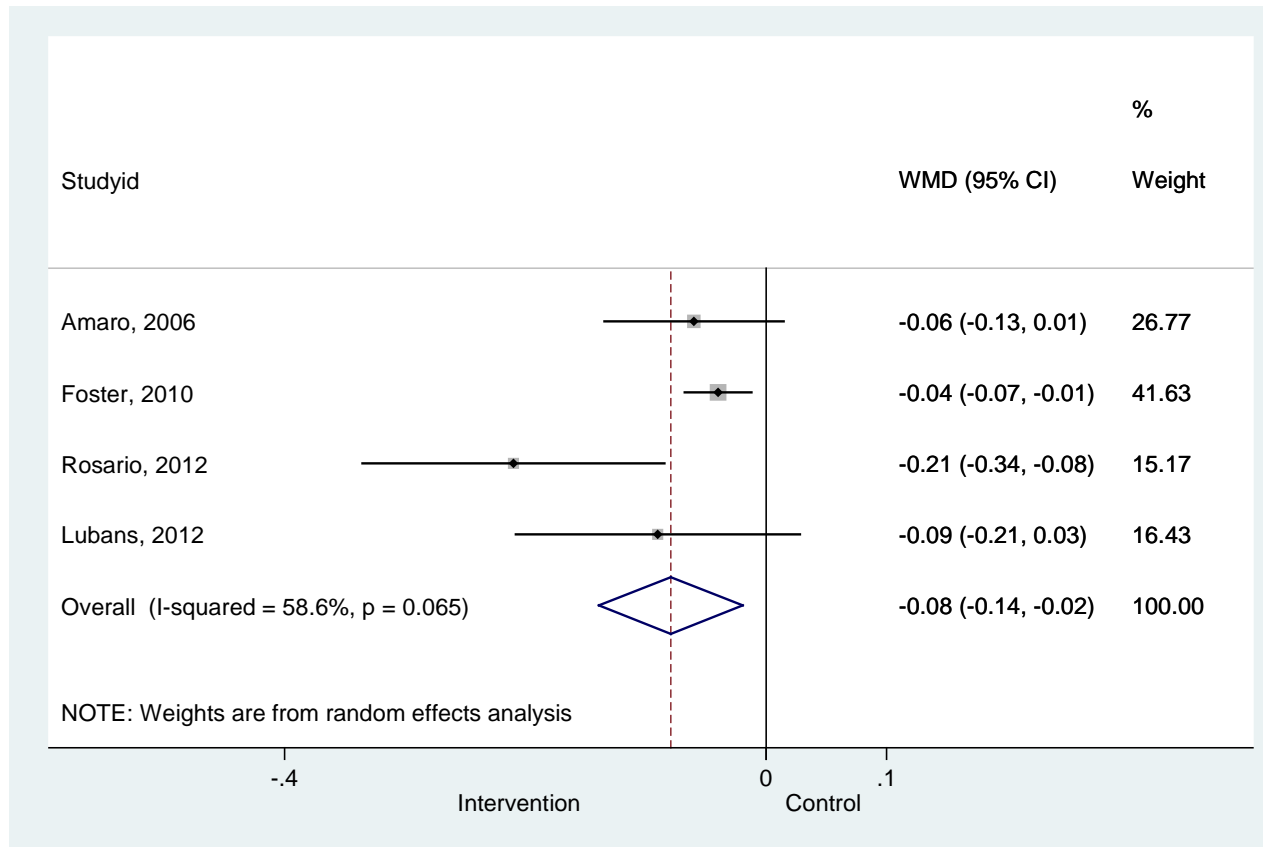
**Table 5. Summary of the strength of evidence for weight-related outcomes in studies taking place in a school setting**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
School	D, 2	1995-2012	1,782	0/2/0	50	100	Moderate	Consistent	Imprecise	Direct	Moderate
	PA, 15	1993-2011	10,086	0/13/2	26	73	Moderate	Consistent	Imprecise	Direct	Moderate
	C, 37	1985-2012	41,875	2/27/8	45	54	Low	Inconsistent	Imprecise	Direct	Insufficient

D = diet intervention; PA = physical activity intervention; C = combination of diet and physical activity interventions

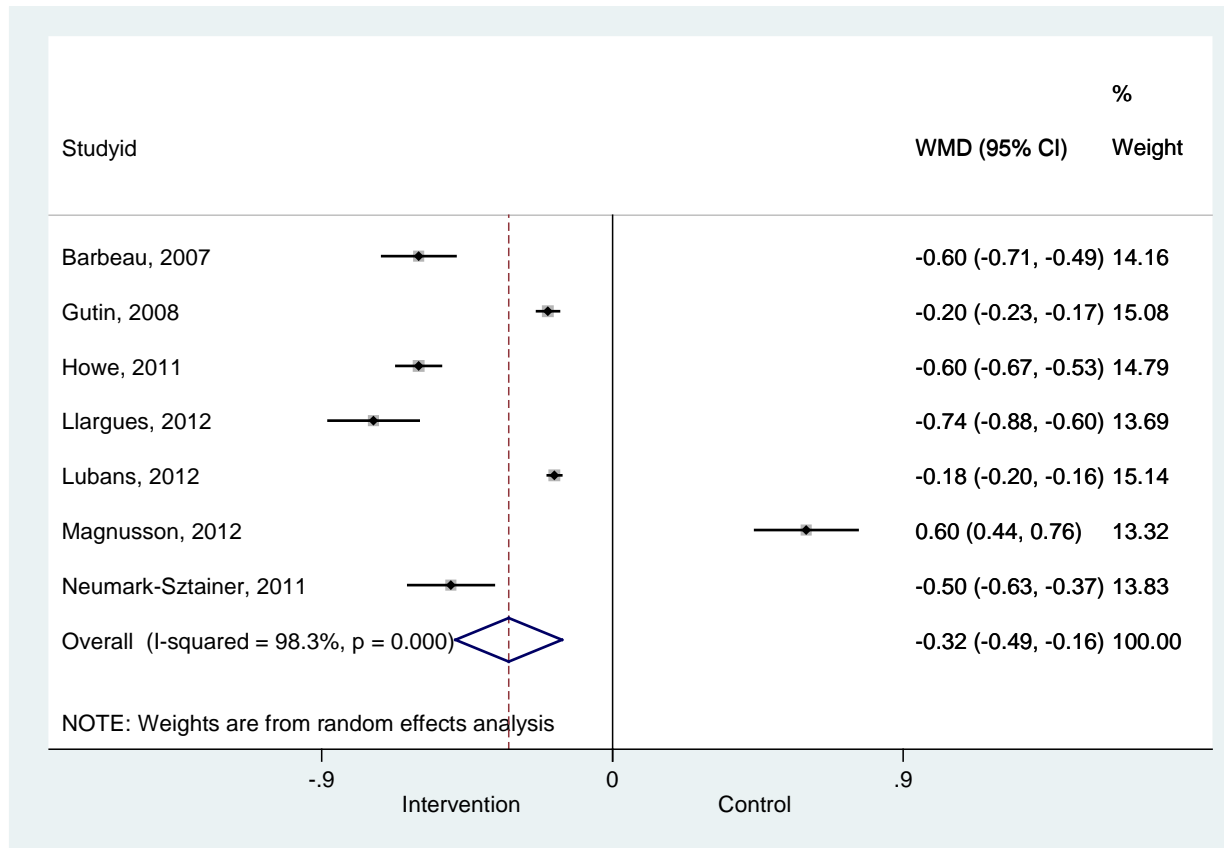
\*Total = 54-one study reported on diet, physical activity, and combination interventions, therefore was counted more than once.

**Figure 3. Meta-analysis of change in BMI z-score between the control and combined diet and physical activity intervention groups in three school-only settings**



WMD = weighted mean difference

**Figure 4. Meta-analysis of change in BMI between the control and combined diet and physical activity intervention groups in four school-only settings**



WMD = weighted mean difference



## School-Home–Based Studies

### Study Characteristics

Thirty studies reported on interventions delivered in the school and home settings. Of these, 21 (70 percent) were RCTs,<sup>114-134</sup> and 9 (30 percent) were non-RCTs.<sup>135-143</sup> Six of the non-RCTs consisted of a non-randomized control group design,<sup>135-138,140,142</sup> one was a pre-test/post-test, matched control group, quasi-experimental design,<sup>143</sup> one was a pretest/posttest study design,<sup>141</sup> and one used a serial cross-sectional design.<sup>139</sup> Twenty-four studies (80 percent) measured obesity prevention in children.<sup>115-117,119-123,125-133,136-139,141-143</sup> The remaining studies measured other outcomes but contained data on weight maintenance.<sup>114,124,134,135,140</sup> (Table 6; Appendix E, Evidence Table 7).

Fifteen studies (48 percent) took place in the U.S.,<sup>114-117,119,122,126,130,133,134,138,139,141-143</sup> and the remainder were conducted in England,<sup>129</sup> Greece,<sup>123,124,135,140</sup> Australia,<sup>118</sup> France,<sup>132</sup> Germany,<sup>120,127,131</sup> Israel,<sup>136</sup> Italy,<sup>137</sup> Spain,<sup>128</sup> Sweden,<sup>125</sup> and Switzerland (Table 6; Appendix E, Evidence Table 7).<sup>121</sup>

### Population Characteristics

The total number of participants in the 30 studies combined was 28,413.<sup>114-143</sup> The number of participants in each individual study ranged from 114<sup>141</sup> to 3,714 (Table 6; Appendix E, Evidence Table 8).<sup>122</sup>

The length of follow-up ranged from 26 weeks (6 months) to 520 weeks (10 years). Eleven studies had a follow-up period of 1 year or less.<sup>114,116-118,121,123,127,131,137,139,140</sup> Twelve studies had a follow-up period of between 1 and 2 years,<sup>119,126,128-130,133,134,136,138,141-143</sup> six studies had a follow-up period of 3 or 4 years,<sup>115,120,122,125,132,135</sup> and one study had a follow-up period of 10 years (Table 6; Appendix E, Evidence Table 8).<sup>124</sup>

All studies contained both girls and boys, and all but three studies reported the percentage of girls in the study.<sup>114,116,117,119-136,138-143</sup> Most studies had roughly half girls and half boys, with the percentage of girls ranging from a low of 44.8 percent<sup>116</sup> to a high of 58.5 percent (Table 6; Appendix E, Evidence Table 8).<sup>130,133</sup>

Twenty-three studies (77 percent) reported the mean age of participants,<sup>114,115,117-121,123,125-134,138-142</sup> which ranged from 5.8 years<sup>126</sup> to 13.2 years.<sup>123</sup> The oldest participant was 14 years old (Table 6; Appendix E, Evidence Table 8).<sup>140</sup>

One study included kindergarten children<sup>126</sup>; twenty-four studies (80 percent) included children in grades one through six.<sup>114-117,119-122,124,125,127-136,139,141-143</sup> one study included children in grade seven.<sup>123</sup> The remaining four studies did not report the specific grade of their participants.<sup>118,137,138,140</sup> There were no high school students in any of the school-home studies (Table 6; Appendix E, Evidence Table 8).

Thirteen of 30 studies (43 percent) reported the race or ethnicity of study participants.<sup>114,115,119,122,126,130,133,134,138,139,141-143</sup> In five of the studies, the majority of participants were white (63 percent,<sup>119</sup> 69 percent,<sup>122</sup> 78 percent,<sup>142</sup> 83 percent,<sup>134</sup> and 94 percent).<sup>141</sup> In three of the studies, the majority of participants were Hispanic (66 percent,<sup>139</sup> 68 percent,<sup>138</sup> and 93 percent).<sup>143</sup> In two of the studies, the participants were primarily Black (68 percent<sup>130</sup> and 46 percent)<sup>133</sup>; in another two studies, participants were primarily American Indian (100 percent<sup>126</sup> and ≥ 90 percent<sup>115</sup>); and in the last study, participants were primarily Mexican American (80

percent).<sup>114</sup> Among the studies that did not report race, only two were U.S. studies.<sup>116,117</sup> (Table 6; Appendix E, Evidence Table 8).

## **Interventions**

Twenty-six of the 30 studies (87 percent) included combined diet and physical activity interventions.<sup>114-116,118-120,122-131,133-136,138-143</sup> (Table 7; Appendix E, Evidence Table 9). One study included an intervention that focused exclusively on diet modification.<sup>137</sup> (Table 7; Appendix E, Evidence Table 9). Two studies focused exclusively on physical activity interventions,<sup>121,132</sup> and a third study focused on the reduction of sedentary behavior associated with television, videotape, and videogame use (Table 7; Appendix E, Evidence Table 9).<sup>117</sup> There were no studies that reported on self-management alone (Table 7; Appendix E, Evidence Table 9).

**Table 6. Study and participant characteristics of studies based in schools with a home component**

Author, Year	RCT	Goal: Weight Maint	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls†	Mean Age [Range] Years†	Grade†	Race†
Brandstetter, 2012 <sup>127</sup>	Y	Y	Germany	NR	NR	2	NR	1119	52	46.3%	7.57	2	NR
Burke, 1998 <sup>118</sup>	Y	N	Australia	NR	NR	NR	NR	800	26	49%	11	NR	NR
Caballero, 2003 <sup>115</sup>	Y	Y	U.S	NR	NR	3	NR	1,704	156	NR	7.6	3	≥ 90% American Indian
Coleman, 2005 <sup>143</sup>	N	Y	U.S	NR	NR	NR	NR	896	104	47.2%	NR	3	93% Hispanic
Danielzik, 2007 <sup>120</sup>	Y	Y	Germany	NR	NR	NR	NR	1,764	208	50.5%	6.3	1	NR
Dzewaltowski, 2010 <sup>119</sup>	Y	Y	U.S	NR	NR	NR	NR	273	104	50%	9.3	3,4	62.7% WNH, 18.8% BNH, 8.9% American Indian, 6.6% Hispanic, 3% Other
Foster, 2008 <sup>133</sup>	Y	Y	U.S	NR	NR	NR	NR	1,349	104	53.7%	11.2	4, 5, 6	45.6% BNH, 22.4% Asian, 14.1% Hispanic, 12.4% WNH, 5.5% Other
Hatzis, 2010 <sup>124</sup>	Y	N	Greece	NR	NR	NR	NR	634	520	52.4%	NR	1	NR
Hendy, 2011 <sup>116</sup>	Y	Y	U.S	NR	NR	NR	NR	382	52	44.8%	NR	1,2,3,4	NR
Hoelscher, 2010 <sup>139</sup>	N	Y	U.S	NR	NR	NR	NR	1,107	52	53%	9.9	4	66% Hispanic, 20% WNH, 14% BNH

**Table 6. Study and participant characteristics of studies based in schools with a home component (continued)**

Author, Year	RCT	Goal: Weight Maint	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls†	Mean Age [Range] Years†	Grade†	Race†
Hollar, 2010 <sup>138</sup>	N	Y	U.S	NR	NR	NR	NR	1,197	68	51%	7.8	NR	68% Hispanic, 15% WNH, 9% BNH, 8% Other
Hopper, 2005 <sup>134</sup>	Y	N	U.S	NR	NR	NR	NR	238	86	49%	7.6	3	83% WNH, 5% Hispanic, 5% Asian, 5% American Indian, 2% BNH
Kriemler, 2010 <sup>121</sup>	Y	Y	Switzerland	NR	NR	NR	NR	502	47	51%	6.9, 11.1	1,5	NR
Llargues, 2011 <sup>128</sup>	Y	Y	Spain	NR	NR	1st year primary school	NR	509	76	45.9%	6.03	1	NR
Lloyd, 2012 <sup>129</sup>	Y	Y	England	NR	9-10 years old	Year 5 class	NR	202	72-96 weeks	50.0%	9.69	5	NR
Lionis, 1991 <sup>140</sup>	N	N	Greece	NR	13-14	NR	NR	171	39	51%	13-14	NR	NR
Manios, 1998 <sup>135</sup>	N	N	Greece	NR	NR	NR	NR	962	156	47%	NR	1	NR
Marcus, 2009 <sup>125</sup>	Y	Y	Sweden	NR	NR	NR	NR	3,152	208	49%	7.5	1,2,3,4	NR
Mihas, 2010 <sup>123</sup>	Y	Y	Greece	NR	12-13	7	NR	191	52	49%	13.2	7	NR
Nader, 1999 <sup>122</sup>	Y	Y	U.S	NR	NR	NR	NR	3,714	156	48%	NR	3	69% WNH, 14% Hispanic, 13% BNH, 4% Other
Robinson, 1999 <sup>117</sup>	Y	Y	U.S	NR	NR	3, 4	NR	198	26	46.6%	8.9	3, 4	NR
Schetzina, 2009 <sup>141</sup>	N	Y	U.S	NR	NR	NR	NR	114	78	53%	9	3, 4	94% WNH, 3% BNH, 3% Other
Shofan, 2011 <sup>136</sup>	N	Y	Israel	NR	NR	NR	NR	118	104	46.6%	9-11	4,5,6	NR

**Table 6. Study and participant characteristics of studies based in schools with a home component (continued)**

Author, Year	RCT	Goal: Weight Maint	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls <sup>†</sup>	Mean Age [Range] Years <sup>†</sup>	Grade <sup>†</sup>	Race <sup>†</sup>
Siegrist, 2011 <sup>131</sup>	Y	N/NR	Germany	NR	NR	2 and 3	NR	724	52	48.3%	8.4	2,3	NR
Simon, 2008 <sup>132</sup>	Y	Y	France	NR	NR	NR	NR	954	208	50.0%	11.6	6	NR
Simonetti D'Arca, 1986 <sup>137</sup>	N	Y	Italy	NR	NR	NR	NR	1,321	52	NR	3-9	NR	NR
Speroni, 2007 <sup>142</sup>	N	Y	U.S	NR	NR	NR	NR	185	104	50.3%	9.3	2, 4	78.3% WNH, 21.7% Hispanic
Story, 2012 <sup>126</sup>	Y	Y	U.S.	NR	NR	Kinder- garten	NR	454	80	48.9%	5.81	Kinder- garten	100% American Indian
Trevino, 2004 <sup>114</sup>	Y	N	U.S	NR	<12	4	NR	1,419	34	49.5%	9.8	4	80% Mexican American
Williamson, 2012 <sup>130</sup>	Y	Y	U.S.	NR	NR	4 to 6; rural communities	NR	2060	121	58.5%	10.5	4,5,6	31.6% WNH; 68.4% Black

AIAN = American Indian/Alaska Native; API = Asian Pacific Islander; BMI = Body Mass Index (in kg/m<sup>2</sup>); BNH = Black Non-Hispanic; BP = Blood Pressure; CVD = Cardio Vascular Disease.; Maint = Maintenance; Meds = Medications; N = No; NR = Not Reported; physical activity = Physical Activity; RCT = Randomized Controlled Trials;

WNH = White Non-Hispanic; Y=Yes

\*Inclusion/exclusion criteria.

<sup>†</sup>Participant characteristics.

**Table 7. Interventions of studies based in schools with a home component**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Brandstetter, 2012 <sup>127</sup>	Usual care	URMEL-ICE: School health promoting behavior change Family homework lessons, training and information of parents.	X		X	X
Burke, 1998 <sup>118</sup>	Usual care	WASPAN <sup>a</sup> : Classroom lessons on physical activity and nutrition. Home-based nutritional program for children and their families.	X			X
	Usual care	WASPAN <sup>b</sup> : Classroom nutrition and physical activity lessons with physical education enrichment activities. Home-based nutritional program for children and family.	X			X
Caballero, 2003 <sup>115</sup>	Usual care	Classroom curriculum Family involvement.	X	X	X	X
Coleman, 2005 <sup>143</sup>	Usual care	Classroom and school wide physical education and nutrition changes in the cafeteria Home reduction of sedentary activity	X	X	X	X
Danielzik, 2007 <sup>120</sup>	Usual care	Behavioral and educational messages using nutrition fairy tales about eating fruit and vegetables every day and reduce intake of high-fat foods. Behavioral and educational messages to keep active and decrease television consumption Preparing a healthy breakfast at home	X		X	
Dzewaltowski, 2010 <sup>119</sup>	Usual care	HOP'N after school: a weekly social-cognitive-theory based curriculum (eat fruits and vegetables and increase physical activity). Home—no more than 2 hours a day sedentary activity; remove TV from the bedroom.	X	X	X	X
Foster, 2008 <sup>133</sup>	Usual care	School Nutrition Policy Initiative: classroom-based nutrition education, foods sold met a specified nutritional standard; physical activity linked to personal behavior. Reduced sedentary activity at home.	X	X	X	
Gorely, 2009 <sup>144</sup>	Usual care	GreatFun2Run: increase children's activities through physical activity on running. Raise awareness at home	X		X	X
Hatzis, 2010 <sup>124</sup>	Usual care	"Know Your Body" education material with major modifications to the Mediterranean diet of Crete and the orthodox Christian church fasting rituals.	X		X	
Hendy, 2011 <sup>116</sup>	Usual care	KCP group (LIONS)-received stars for 3 good health behaviors.	X		X	

**Table 7. Interventions of studies based in schools with a home component (continued)**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Hoelscher, 2010 <sup>139</sup>	Usual care	CATCH BP <sup>c</sup> Classroom curricula and a physical education program, a child nutrition services component Family involvement	X	X	X	X
	Usual care	CATCH BPC <sup>d</sup> Classroom curricula and a physical education program, a child nutrition services component Family involvement Community action team	X	X	X	X
Hollar, 2010 <sup>138</sup>	Usual care	HOPS intervention: School provided diet, classroom curricula, and physical activity during school day.	X	X	X	X
Hopper, 2005 <sup>134</sup>	Usual care	School classroom lessons on nutrition and exercise. Home activities for parents and children to complete.	X		X	X
Kriemler, 2010 <sup>121</sup>	Usual care	KISS: School based stringent physical activity program Home daily physical activity homework of about 10 minutes.				X
Lionis, 1991 <sup>140</sup>	Usual care	School health education curriculum.	X		X	
Llargues, 2011 <sup>128</sup>	Usual care	Education about food habits and physical activity: developing posters, food tables, games, crafts, cooking workshops and promotion of games in the playground.	X		X	
Lloyd, 2012 <sup>129</sup>	Usual care	School newsletters, plays, homework, assembly Home: multiple activities involving home and parents	X		X	
Manios, 1998 <sup>135</sup>	Usual care	School health education plus physical activity components. Provide parents screening results and lessons on the importance of children's dietary and exercise habits.	X		X	X
Marcus, 2009 <sup>125</sup>	Usual care	Diet and physical activity awareness: Change the school environment, including school lunches, afternoon snacks, after school care activities and sports days. Parents were asked not to provide unhealthy snacks for birthdays etc.		X		X
Mihas, 2010 <sup>123</sup>	Usual care	Health and nutrition education	X		X	
Nader, 1999 <sup>122</sup>	Usual care	CATCH intervention: targeted consuming foods low in fat, saturated fat and sodium via a multicomponent program that included school environmental changes, and a family component.	X	X	X	X
Robinson, 1999 <sup>117</sup>	Usual care	Classroom curriculum to reduce television, videotape, and video game use.			X	X

**Table 7. Interventions of studies based in schools with a home component (continued)**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Schetzina, 2009 <sup>141</sup>	Usual care	Winning with Wellness Pilot program: classroom instruction, school health services, and removing soda from vending machines and physical education and activity	X		X	X
Shofan, 2011 <sup>136</sup>	Usual care	Focused on increased physical education and activity together with nutritional advice to the children and their families.	X			X
Siegrist, 2011 <sup>131</sup>	Usual care	JuvenTUM: educate students, parents and teachers; alter school environments for diet and physical activity	X	X	X	X
Simon, 2008 <sup>132</sup>	Usual care	School education on physical activity and sedentary behaviors, opportunities for physical activity were offered. Parents were asked to support the child's physical activity.			X	X
Simonetti D'Arca, 1986 <sup>137</sup>	Usual care	Written Action School: Focused on educating staff, students and parents using printed material only.	X			
	Usual care	Multi-media Action School: Focused on educating staff, students and parents using media.	X			
Speroni, 2007 <sup>142</sup>	Usual care	After-school exercise and diet education program	X			X
Story, 2012 <sup>126</sup>	Usual care	Bright Start: School physical activity sessions, nutritional lessons Goal to increase health awareness and better eating habits at home through motivational interventions		X		X
Trevino, 2004 <sup>114</sup>	Usual care	School health behavior messages in classroom, school cafeteria, and after-school care. Reinforced at home and after school care.	X		X	X
Williamson, 2012 <sup>130</sup>	Usual care	School change in food from school cafeterias and vending machines, physical activity in class, during recess and PE classes Newsletters sent home providing campaign-specific information		X		X

Phys/Env = Physical/environmental intervention; Psych = psychosocial intervention

<sup>a</sup>Western Australian Schools Physical Activity and Nutrition.

<sup>b</sup>Western Australian Schools Physical Activity and Nutrition plus physical activity enrichment for children with high cardiovascular risk.

<sup>c</sup>Coordinated Approach To Child Health BasicPlus (CATCH BP).

<sup>d</sup>Coordinated Approach To Child Health BasicPlus (CATCH BP) plus Community.



## **Outcomes**

### **Diet Interventions**

There was one diet-only intervention, which employed an educational approach to diet and nutrition (Appendix E, Evidence Table 10a,b).<sup>137</sup>

### **Weight-Related Outcomes**

#### **Prevalence of Overweight and Obesity**

This RCT with 1,321 participants<sup>137</sup> measured the change of prevalence in overweight and obesity after 1 year. It compared two different interventions to one control group. In the control school, students received usual care. The study called one intervention the written action (WA) intervention, and the other the multi-media action (MA) intervention. The results of this study demonstrated an increase in the prevalence of overweight students (+0.8 percent) and obese students (+5.9 percent) in the control group. The WA intervention arm led to a 2.3 percent decrease in overweight students, but a 5.3 percent increase in obese students. However, the MA intervention led to 12.1 percent reduction in the prevalence of overweight students and a 12.2 percent reduction in the prevalence of obese students at the end of the study.(Appendix E, Evidence Table 10a,b).

Among boys, there was a 2.0 percent reduction in overweight in the control group versus the MA group, and a 1.6 percent increase in the control group versus the WA group. Among girls, there was a 5.4 percent reduction in overweight in the control group versus the MA group, and a 3.7 percent reduction in the control group versus the WA group (Appendix E, Evidence Table 10a). Among boys, there was a 2.6 percent reduction in obese children in the control group versus the MA group, and a 1.1 percent increase in the control group versus the WA group. Among girls, there was a 2.2 percent reduction in obese children in the control group versus the MA group, and a 1.0 percent increase in the control group versus the WA group (Appendix E, Evidence Table 10a).

#### **Clinical Outcomes**

The research did not report any.

#### **Adverse Events**

The research did not report any.

#### **Intermediate Outcomes**

The research did not report any.

#### **Interpretation**

The results from an outcome measure from this study support our conclusions. In this study, the less intensive intervention, which relied exclusively on the dissemination of printed material, was less effective in reducing the prevalence of overweight and obesity compared to the intervention, which employed qualified staff to interact directly with students, teachers, and parents through meetings, discussions, and other interactive activities.

## Physical Activity Interventions

Two studies focused exclusively on physical activity interventions. These studies were multi-component physical activity programs that included both an educational and environmental approach to physical activity.<sup>121,132</sup> A third study focused on the reduction of sedentary behavior associated with television, videotape, and videogame use (Appendix E, Evidence Table 11a,b).<sup>117</sup>

## Weight-Related Outcomes

### BMI

Of the three studies reported above that measured change in BMI,<sup>121,132,117</sup> all three showed a statistically significant reduction in the intervention group relative to the control group: -0.12 ( $p<.003$ ); -0.26 at 2 years, -0.25 at 3 years, and -0.25 at 4 years, ( $p=0.01$ ), and -0.45 ( $p=.002$ ), respectively (Appendix E, Evidence Table 11a,b).

### Prevalence of Overweight and Obesity

One physical activity study found a reduction in the prevalence of overweight in the intervention group relative to the control: at 4 years; 4.2 percent of the initially non-overweight students were overweight in the intervention schools, compared to 9.8 percent in the control schools (odds ratio [OR], 95% confidence interval [CI]=0.41 [0.22; 0.75]) (Appendix E, Evidence Table 11a,b).<sup>132</sup>

### Percent Body Fat

One study stratified the analysis according to “initially non-overweight” and “initially overweight” participants, the results showed an improvement in percent body fat in the “initially non-overweight” group (-0.55 percent,  $p=0.19$ ) in the intervention group, but a worsening in the “initially overweight” group (1.33 percent,  $p=0.18$ ) (Appendix E, Evidence Table 11a,b).<sup>132</sup>

### Waist Circumference

Of the two studies that measured change in waist circumference (cm),<sup>121,117</sup> both showed a reduction in waist circumference in the intervention group relative to the control group, -0.08 ( $p=0.25$ ) and -2.30 ( $p<0.001$ ), respectively (Appendix E, Evidence Table 11a,b).

### Skinfold Thickness

The study that measured triceps skinfold thickness showed a decrease of 1.47 ( $p=0.002$ ) in the intervention group relative to the control group (Appendix E, Evidence Table 11 a,b).<sup>117</sup>

The study that measured change in the sum of four skinfolds showed an decrease of 0.12 ( $p=0.009$ ) in the intervention group relative to the control group (Appendix E, Evidence Table 11a,b).<sup>121</sup>

## Clinical Outcomes

One study computed a cardiovascular risk score that included all components of the metabolic syndrome, including average z-score of waist circumference, mean blood pressure, blood glucose, inverted HDL cholesterol, and triglycerides. The results showed that the intervention resulted in an improvement in the cardiovascular risk score, corresponding to 0.18 (-0.29 to -0.06) z-score units ( $p=0.003$ ).<sup>121</sup> Two studies found a reduction of -0.08 mm Hg ( $p=0.88$ )<sup>121</sup> and -0.42 mm Hg ( $p=0.66$ )<sup>132</sup> in systolic blood pressure in favor of the intervention,

but neither result was statistically significant. Two studies<sup>121 132</sup> found a reduction of 0.12 (p=0.02) and 0.46 (p=0.60), respectively in diastolic blood pressure, mostly in favor of the intervention relative to the control group. One study found an increase in total cholesterol of 2.71 (p=0.15) in the intervention group relative to the control group.<sup>132</sup> Two studies showed an increase in HDL. One showed an increase in HDL of 3.43 (p<0.0001),<sup>132</sup> and one showed a decrease of -0.78 which was not significant.<sup>140</sup> Two studies<sup>121 132</sup> found a reduction in triglycerides in favor of the intervention (-0.10, p<0.02) and (-2.60, p=0.34), respectively. One study<sup>132</sup> found no difference in glucose between the intervention and control group (0.0, p=0.81). One study found a slight increase in the intervention group relative to the control group (0.03 (95% CI -0.98; 1.04) p=0.96), and a slight increase in HOMA in the intervention group relative to the control group (0.01 (95% CI -0.23; 0.24) p=0.95) (Appendix E, Evidence Table 11c).<sup>132</sup>

## Adverse Events

The research did not report any.

## Intermediate Outcomes

One study reported a large number of intermediate outcomes which included a series of child and parent reported measures of television viewing, diet, and physical activity and fitness.<sup>117</sup> The children-reported measures showed a consistent reduction (on a per-week basis) in favor of the intervention group with respect to all of the following measures: 5.53 fewer hours of television (p<0.001), 1.53 fewer hours of videotapes (p=0.11), 2.54 fewer hours of videogame usage (p=0.01), 0.54 fewer meals in front of the TV (p=0.01), 0.11 fewer snacks in front of the television (p=0.16), 0.82 fewer daily servings of high fat food (p=0.12), and 0.34 fewer other sedentary behaviors (p=0.44). The only outcomes that did not show a reduction were daily servings of high-advertised foods (increase of 0.06, p=0.71) and the 20-meter shuttle test (fewer cones by 0.87, p=0.45).<sup>117</sup>

Parent reports of their children's behavior yielded similar results: 4.29 fewer hours of TV (p<0.001), 0.25 fewer hours of videotapes (p=0.60), 0.76 fewer video game hours (p=0.13), 0.77 fewer hours of household TV use (p=0.10), 1.1 fewer meals in front of the TV (p=0.02), 1.9 percentage decline in TV viewing while snacking (p=0.59), 4.88 fewer other sedentary behaviors (p=0.16), and 2.0 more hours/week of physical activity, (p=0.13) (Appendix E, Evidence Table 11d).<sup>117</sup>

In another study, there was an improvement in the Shuttle Run of 0.17 cones in the intervention group relative to the control group (p=0.04); an increase in in-school physical activity (counts/min) by 0.92 (p=0.003); and an increase in in-school total moderate to vigorous physical activity (min/day) by 1.19, p<0.001.<sup>121</sup> In a second study, intervention students had an increase in supervised physical activity (p=0.0001) and a reduction in TV/video viewing (p=0.01) relative to the control group (Appendix E, Evidence Table 11d).<sup>132</sup>

## Interpretation

The results from an outcome measure from these two studies support our conclusions. Even though two of the three studies focused on increasing physical activity and the other focused on decreasing sedentary behavior, they all demonstrated some improvements in BMI, waist circumference, and skinfold thickness due to the intervention. This suggests that interventions aimed at either increasing physical activity or reducing sedentary behavior can be effective at preventing obesity.

## Diet and Physical Activity Interventions

Twenty-six of 30 studies conducted in both the school and home setting implemented combined diet and physical activity interventions. Of the 27, 18 were RCTs (Appendix E, Evidence Table 12a,b).

## Weight-Related Outcomes

Twenty-three out of 30 studies included a measure of BMI, BMI z-score, or BMI percentile. Of these, six were statistically significant in favor of the intervention, 14 were nonsignificant, two did not report p-values, and one had inconsistent results.

### BMI z-Score

Among the eight studies that measured BMI z-score, one showed significant reductions in favor of the intervention (-0.34)<sup>138,144</sup> and the rest did not.<sup>120,126,129-131,133,141</sup>

### BMI

Among the 17 studies that measured BMI, 14 showed a reduction in BMI in the intervention group relative to the control group, with the magnitude of difference ranging from -0.4 to -1.20 kg/m<sup>2</sup>. However, only four of these changes were statistically significant.<sup>124,128,135,140</sup>

There were seven studies<sup>118,119,126,131</sup> (but a total of eight active intervention arms) that we included in a meta-analysis for the BMI (kg/m<sup>2</sup>) outcome measure. The results of the meta-analysis yielded an overall weighted mean difference of 95 percent -0.17 kg/m<sup>2</sup> (95% CI: -0.57, 0.23, p=0.407), which favored the control over the intervention, but was not statistically significant. Studies were excluded from the meta-analysis for the following reasons: a) if they were not an RCT, b) if there was considerable heterogeneity when included in the analysis, c) if there was insufficient outcome reporting, or d) if there was an insufficient numbers of studies with a similar intervention. (Figure 5) (Appendix E, Evidence Table 12 a, b).

One study compared one control arm with two intervention arms.<sup>118</sup> One intervention arm was the Western Australian Schools Physical Activity and Nutrition project, and the second intervention arm was Western Australian Schools Physical Activity and Nutrition project plus a physical education enrichment program targeting only children with higher levels of cardiovascular risk (Appendix E, Evidence Table 12a). There was no improvement in BMI in either boys or girls due to either intervention arm.

### BMI Percentile

Two studies reported BMI percentile. One showed a clear reduction in due to the intervention,<sup>142</sup> (-3.8 percent, p<0.01). The other study examined change in BMI percentile in two strata of participants: average weight participants (n=200) and overweight participants (n=112).<sup>116</sup> At the 3-month followup period, the results showed a nonsignificant reduction in average weight participants by 2.40 percent (p=0.32) relative to the control group, but a significant reduction in overweight participants by 2.60 percent (p=0.001). However, this reduction was not maintained when reexamined 6 months later. The third study showed no effect of the intervention on the BMI percentile.<sup>94</sup> (Appendix E, Evidence Table 12a,b).

### Prevalence of Overweight and Obesity

Only one study examined the change in the incidence of overweight and obesity due to the intervention.<sup>133</sup> After controlling for gender, race/ethnicity, and age, this study found that the odds of becoming *overweight* in the intervention group were 33 percent lower for the

intervention group compared to the control group (adjusted OR, 0.67 [95% CI 0.47–0.96],  $p<0.03$ ). However, there were no differences in the incidence of obesity between the intervention and controls schools (adjusted OR, 1.00 [95% CI 0.66–1.52],  $p=0.99$ ) (Appendix E, Evidence Table 12a,b).

After 2 years, the unadjusted prevalence of overweight had decreased by 10.3 percent in intervention schools and had increased by 25.9 percent in control schools. After controlling for gender, race/ethnicity, age, and baseline prevalence, the predicted odds of overweight prevalence were 35 percent lower for the intervention group (adjusted OR 0.65 (95% CI 0.54–0.79),  $p<0.0001$ ). Similar to the results for incidence of obesity, there was no apparent reduction in the prevalence of obesity as a result of the intervention (adjusted OR 1.09 (95% CI 0.85–1.40),  $p=0.48$ ) (Appendix E, Evidence Table 12a,b).

A study with similar results<sup>126</sup> showed a 10 percent reduction in the prevalence of overweight (between 85 and 95 percentile) in favor of the intervention group ( $p=0.019$ ), but no corresponding change in the prevalence of obesity ( $\text{BMI} \geq 95^{\text{th}}$  percentile).

Another study<sup>125</sup> found a significant reduction in the prevalence of overweight (-3.70 percent,  $p<0.05$ ), obesity (-2.30 percent,  $p<0.05$ ), and the two together (-6.00 percent,  $p<0.05$ ) due to the intervention (Appendix E, Evidence Table 12a,b).

One study compared two different intervention arms: the Combined Approach to Child Health (CATCH) curriculum Basic Plus (BP) and the CATCH Basic Plus Community (BPC).<sup>139</sup> There was no control group in this study. The CATCH BP led to a reduction of 3.1 percent ( $p=0.33$ ) prevalence of overweight and obesity from baseline to followup, and the CATCH BPC led to a reduction of 8.30 percent ( $p<0.005$ ), indicating that the enhance CATCH BPC had a greater effect on weight control than the CATCH BP intervention (Appendix E, Evidence Table 12a,b).

In one study, the prevalence of overweight and obesity had decreased by -7.6 percent in the intervention group by 18 months, and by -9.7 percent by 24 months.<sup>129</sup>

In another study, the prevalence of overweight increased by 8.0 percent in the control group but only by 5.3 percent in the intervention group, and the prevalence of obesity increased by 0.5 percent in the control group, but decreased by 3.6 percent in the intervention group. Prevalence of excess weight (overweight and obesity) increased by 8.5 percent in the control group and by 1.8 percent in the intervention group.<sup>128</sup>

One study that compared the risk of overweight or overweight in girls and boys found that the rate of increase in percent overweight was 2.0 percent for girls in the intervention schools compared to 13.0 percent for girls in the control schools; and 1.0 percent in boys in the intervention schools compared to 9.0 percent in the control schools (Appendix E, Evidence Table 12b).<sup>143</sup>

### Percent Body Fat

Among the four studies that investigated change in percent body fat, only one showed a reduction in percent body fat in the intervention group relative to the control group by -0.83 at 18 months and -1.28 at 24 months.<sup>129</sup>; the other four demonstrated a trend in favor of the control group,<sup>114,115,124,126</sup> although the results were not statistically significant (Appendix E, Evidence Table 12a,b). A final study found no differences between groups in percent body fat for either girls or boys.<sup>130</sup>

## **Waist Circumference**

Among the six studies that reported waist circumference, five showed a reduction due to the intervention<sup>120,124,127,129,131</sup> (-0.80, -0.70, -0.61, -2.01, and -1.70 cm, respectively), and one study showed an increase, but the change was not significant<sup>118</sup> (Appendix E, Evidence Table 12a,b).

## **Skinfold Thickness**

Among the six studies that measured change in triceps skinfold thickness, three showed an improvement in the intervention group, relative to the control group<sup>122,127,135</sup>, and the remaining three studies revealed an increase in the intervention group, although none of these differences were statistically significant<sup>115,122,126,140</sup> (Appendix E, Evidence Table 12a,b). Four studies measured change in subscapular skinfolds. None showed a significant difference between groups (Appendix E, Evidence Table 12a, b).<sup>115,122,126,135</sup>

## **Clinical Outcomes**

One study found a small reduction in systolic blood pressure and a reduction of -2.47 mm Hg and -2.09 mm Hg, respectively in diastolic blood pressure (fourth and fifth phase) in favor of the intervention group. (Appendix E, Evidence Table 12c)<sup>140</sup> This study also demonstrated significant improvements in cholesterol levels in the intervention group, including a decrease in total cholesterol of -17.21 (p<0.001); a reduction in LDL of 17.6 (mg/l) (p<0.0001), and improvements in the ratio of LDL/HDL and the ratio of total cholesterol to HDL of 0.31 (p<0.001) and 0.31 (p<0.001), respectively.<sup>140</sup> (Appendix E, Evidence Table 12c).

## **Adverse Events**

The research did not report any.

## **Intermediate Outcomes**

### **Physical Activity and Sedentary Behavior**

Fifteen of the 16 studies that measured change in physical activity showed some improvement in physical activity in the intervention group relative to the control group.

Among the studies that measured number of steps, one study demonstrated that the intervention group increased the number of steps it took by 11,971 steps per month, compared to 758 steps in the control group (p=0.011) (Appendix E, Evidence Table 12d).<sup>116</sup> In a study with a pre-test/post-test design, participants took an average of 886 more steps after the intervention compared to before (p<0.001).<sup>141</sup>

Among studies that measured total physical activity, one study showed a slight increase in total physical activity of 0.30 hours/wk (95 percent CI- 0.40 to 1.0 hr/wk, p=0.40) and a corresponding reduction in total inactivity in the intervention group relative to the control (p<0.001) (Appendix E, Evidence Table 12).<sup>133</sup> Another study demonstrated a 10.8 percent increase in the proportion of students who exercised greater than or equal to 7 times per week, but no increase in the actual exercise intensity (-0.30). One study showed that participants in the intervention group increased the amount of time they spent playing outside (by 2 percent), participating in sports clubs (by 5 percent) and participating in sport activity outside of sports club (by 8 percent) compared to the control group.<sup>127</sup> Another study showed an increase of 10 percent in the intervention group in the amount of physical activity performed outside of school compared to the control group.<sup>145</sup> Two other studies showed an increase in the number of active

days per week<sup>131</sup> and the number of minutes of physical activity per week<sup>126</sup>, but neither of these results were statistically significant. One study demonstrated an improvement in physical activity in three out of five measures, including number of days engaged in at least 30 minutes of vigorous physical activity (0.3), number of days played outdoors (0.1), and number of days played sports activity (0.2); but there was no improvement in the percent engaged in at least 30 minutes of vigorous physical activity per day (-0.6), nor in the number of days participated in some organized activity (-0.1) (Appendix E, Evidence Table 12d).<sup>139</sup>

Among studies that measured moderate to vigorous physical activity, one study showed a statistically significant improvement of 1.6 minutes ( $p<0.005$ ) in the intervention group relative to the control group. (Appendix E, Evidence Table 12d).<sup>135</sup> Another study demonstrated a 3 percent increase in the number of students engaged in vigorous physical activity ( $p<0.05$ ) and a 5 percent increase in the number of students engaged in moderate to vigorous physical activity (nonsignificant) in the intervention group relative to the control group (Appendix E, Evidence Table 12d).<sup>143</sup> A final study showed an improvement of 8.8 more minutes of vigorous physical activity in the intervention compared to the control group ( $p=0.001$ ) (Appendix E, Evidence Table 12d).<sup>122</sup>

In one study, there was a nonsignificant increase in physical activity according to a motion sensor (average vector magnitude/min) of 20.43 (95% CI= -19.05, 59.92) in the intervention group relative to the control group ( $p=0.310$ ) (Appendix E, Evidence Table 12).<sup>115</sup> And another study showed an increase of 18 counts per minute of physical activity in the intervention group compared to the control group. The one study that did not show improvement measured physical activity by a self-administered activity checklist.<sup>130</sup>

Seven studies measured change in sedentary behavior. All five of the studies that measured screen time, showed a reduction in TV, video, or computer usage in the intervention group compared to the control group.<sup>118,127,129,133,139</sup> In one study, which compared the CATCH BP Program to CATCH BPC, the BPC group showed a 4.7 percent reduction ( $p=0.095$ ) among students who watched greater than 2 hours of TV per day, a -5.6 percent reduction ( $p=0.182$ ) among students who spent greater than 2 hours on the computer per day, and a 1.3 percent reduction ( $p=0.182$ ) among students who played greater than 2 hours of video games per day.<sup>139</sup> In another study, according to student's diaries, there was no overall change in physical activity or TV-watching, except for the subgroup of boys in the physical activity enrichment arm of the study.<sup>118</sup> In a third study, there was a decrease in total TV hours during the weekdays by 5 percent ( $p<0.0001$ ) and on the weekends to a lesser degree (3 percent,  $p=0.39$ ).<sup>133</sup> Two other studies showed a reduction in general sedentary behavior in the intervention group compared to the control.<sup>128,130</sup> (Appendix E, Evidence Table 12d)

## **Dietary Intake**

Seven of nine studies showed a reduction in caloric intake in the intervention group relative to the control.<sup>122,123,126,130,133,134,140</sup> Of the remaining two studies, one showed an increase in caloric intake in the intervention group,<sup>124,134,140</sup> and one reported a reduction of -265 (kcal) (95% CI -437 to -94,  $p=0.003$ ) in the intervention group using a 24-hour dietary recall method, but a minor increase in caloric intake according to school-lunch observation measure. (Appendix E, Evidence Table 12d).<sup>115</sup>

Among the seven studies that measured change in fruit and vegetable intake, four showed improvements,<sup>116,126,128,139</sup> two showed no improvement,<sup>125,133</sup> and one showed an improvement in fruit, but not vegetable, intake due to the intervention.<sup>123</sup>

In the first study, the intervention group increased their fruits and vegetables first behavior by 2.31 meals (of six meals), compared to 0.72 in the control group ( $p=0.000$ ) and increased their healthy drinks behavior by 3.46 meals compared to 0.52 meals in the control group, ( $p=0.000$ ).<sup>116</sup> In the second study, there was a small improvement in the number of fruits and vegetables consumed in the intervention group (0.3,  $p=0.074$ ).<sup>139</sup> In the third study, there was no between-group difference in the portions of vegetables consumed per week, but there was a slight, nonsignificant increase of 1.0 portion of fruit consumed per week by the intervention group relative to the control group.<sup>123</sup> In a fourth study, children in the intervention group reported less consumption of high-fat dairy products ( $p=0.001$ ), sweetened cereals ( $p=0.02$ ), and sweet products ( $p=0.002$ ) than children in the control group; however, there was no between-group difference in the amount of fruits and vegetables consumed ( $p=0.47$ ).<sup>125</sup> In the fifth study, fruit and vegetable intake decreased in both groups over time<sup>133</sup> (Appendix E, Evidence Table 12d).

There were four studies that showed modest improvements in the intervention group relative to the control group.<sup>126-128,139</sup> (Appendix E, Evidence Table 12d).<sup>139</sup>

There were two studies that measured change in fatty food intake. One study showed a reduction in grams of fat, percentage of total fat calories, and percentage of calories from saturated fat in the intervention group compared to the control group, however there was no change in the amount of fast food per day.<sup>126</sup> The other study showed a reduction on total fat and saturated fat, but these changes were not significant.<sup>130</sup> An additional study measured change in fatty food intake by the Unhealthy Food Index. This study demonstrated a modest, but significant decrease of -0.6 points on the Unhealthy Food index in the intervention group relative to the control (Appendix E, Evidence Table 12d).<sup>139</sup>

## Interpretation

Our conclusions are based on one outcome measure from each of the 26 studies reporting on combined diet and physical activity interventions. Overall the findings suggest that combined diet and physical activity interventions have favorable effects on weight outcomes, as well as for increasing physical activity, reducing sedentary behavior, and promoting healthier eating.

Seventeen studies reported on BMI ( $\text{kg}/\text{m}^2$ ).<sup>115,118-120,122-124,126-129,131,133-136,140</sup> Fourteen of these studies reported changes in favor of the intervention.<sup>115,119,120,122-124,127-129,131,133-135,140</sup> Among the 14, four were statistically significant.<sup>124,128,135,140</sup>

Two studies reported on BMI percentile,<sup>116,142</sup> which were statistically significant in favor of the intervention.

Three studies reported on BMI percentile,<sup>94,116,142</sup> and two of these were statistically significant in favor of the intervention.

Three studies reported on prevalence of overweight or obesity.<sup>125,139,143</sup> All three showed a significant effect in favor of the intervention.

One study reported on percent body fat.<sup>114</sup> This study was not in favor of the intervention, nor was it statistically significant.

The differences between the statistically significant and non-significant studies that tested a combination physical activity and diet intervention or physical activity intervention do not appear to be related to characteristics related to study participants (sex or age), type of intervention (education or environment), or country. The factors that could contribute to more successful interventions could be related to implementation; other characteristics of the intervention such as intensity, dose, and duration; and participant engagement. These types of characteristics were sought but rarely reported in studies; we were thus unable to explore the impact of these factors on our conclusions. In addition, worth noting it is possible and even likely



that the dose of the home component of many school-based interventions with a home component would be very low, rendering them similar to those school-only based interventions.

Since few studies included clinical outcomes, there is insufficient evidence about the impact of these types of interventions on markers of cardiovascular health.

However, many studies included measures of physical activity, sedentary behavior and dietary intake. Overall, 15 out of 16 studies showed some improvement in physical activity due to the intervention. All seven of the studies that aimed to reduce sedentary behavior, showed a reduction in TV, video, or computer use or other sedentary activity, due to the intervention. Dietary outcomes also showed improvements of various kinds: seven of nine studies showed a reduction in caloric intake in the intervention group relative to the control; four of seven studies showed an increase in fruit and vegetable intake; four of four studies showed a modest decrease in sugar-sweetened beverage intake, and two other studies demonstrated a decrease in fatty food intake.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of the evidence is insufficient that diet interventions positively impact obesity prevention, because there is only one study that contained a diet intervention. In contrast, the strength of the evidence is high that physical activity interventions positively impact obesity prevention. Three out of three studies showed a positive impact in favor of the intervention, and all were statistically significant changes. The strength of evidence is moderate that combined diet and physical activity interventions prevent obesity or overweight in children (Table 8; Appendix F, Strength of Evidence Table 1). While 21 (81 percent) of these studies showed a favorable effect due to the intervention, only 10 (39 percent) were statistically significant. There were no studies addressing adverse events.

### **Intermediate Outcomes**

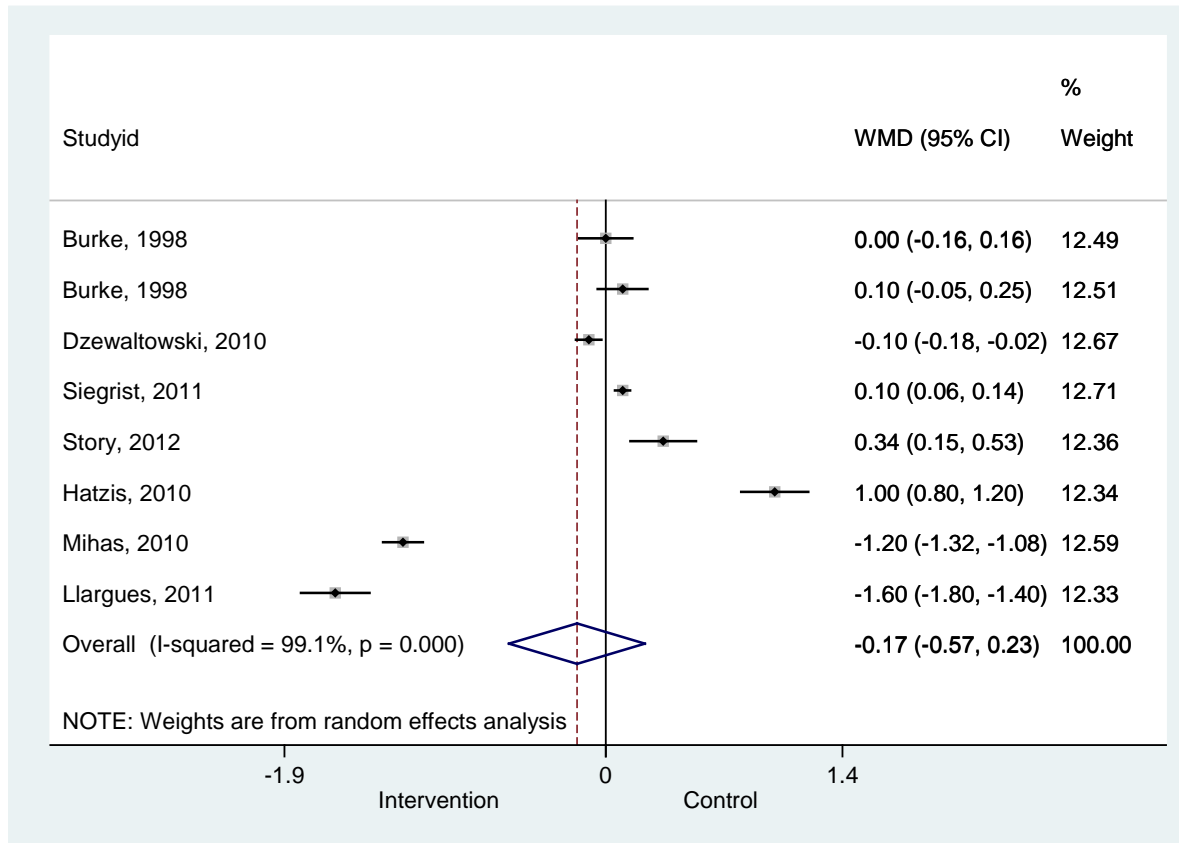
The strength of the evidence is moderate that combined diet and physical activity interventions increase physical activity. However, the strength of the evidence is low that school/home based interventions reduce sedentary behavior, or change dietary intake (e.g., fruit and vegetable intake, energy intake, sugar-sweetened beverage intake, fatty food intake) (Appendix F, Strength of Evidence Tables 2-7).

**Table 8. Summary of the strength of evidence for weight-related outcomes in studies taking place in a school setting with a home component**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable Outcome (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
School-Home	D, 1	1986	1,321	0/1/0	100	100	Moderate	NA	Precise	Direct	Insufficient
	PA, 3	1999-2010	1,654	1/2/0	100	100	Moderate	Consistent	Precise	Direct	High
	C, 26	1991 -2012	25,438	2/20/4	39	81	Moderate	Consistent	Precise	Direct	Moderate

D = diet intervention; PA = physical activity intervention; C = combination of diet and physical activity interventions

**Figure 5. Meta-analysis of change in BMI between the control group and combined diet and physical activity-only interventions in a school setting with a home component**



WMD = weighted mean difference

## School-Home-Community–Based Studies

### Study Characteristics

Out of nine studies, we identified four RCTs<sup>146-149</sup> and five non-RCTs for this section.<sup>150-154</sup> Those nine studies came from 10 articles, since researchers re-analyzed results from one study<sup>151</sup> 4 years later using multi-level analysis and reported the findings in the most recent reference.<sup>155</sup> In six studies, the stated goal of the intervention was obesity prevention or weight maintenance,<sup>147,151-154,156</sup> while the remainder did not state a goal for the interventions.<sup>146,148,150</sup> One study took place in the U.S.,<sup>147</sup> two in the Netherlands,<sup>148,150</sup> two in Australia,<sup>151,152</sup> one in Greece,<sup>146</sup> one in Belgium,<sup>149</sup> one in Canada,<sup>154</sup> and the other in both Germany and Netherlands.<sup>153</sup> Three studies did not specify inclusion criteria,<sup>146,151,153</sup> while four set grade level as an inclusion criterion: two studies enrolled children from elementary and middle schools (grades 3 to 8).<sup>148,150</sup> The former study required schools to have (1) a certified physical education teacher, (2) a majority of pupils with low socio-economic status, and (3) a gymnasium in the school or in the immediate vicinity.<sup>150</sup> The latter study required participants to be able to comprehend the questionnaires and perform the fitness tests.<sup>147</sup> One study enrolled 4 to 12 graders.<sup>154</sup> Another study enrolled children from secondary school,<sup>152</sup> while the last one included only children from pre-elementary school to first grade.<sup>149</sup> Four studies also used age as an inclusion criteria, with two studies enrolling both young children and pre-adolescents (4-12 years old),<sup>148,151</sup> one study enrolling only adolescents (12-18 years old),<sup>152</sup> and one enrolled only young children (3-6 years old) (Table 9; Appendix E, Evidence Table 13).<sup>149</sup>

### Population Characteristics

The nine studies included 14,354 participants. The percentage of girls ranged from 48 to 55.7 percent across studies. The average age of the children was under 15 years in all studies. Seven studies did not report the grade level of children,<sup>147,149-154</sup> one study included only children in grade 5,<sup>146</sup> and the remaining study's enrollment was 53 percent elementary school (grades 3-5) and 47 percent from middle school (grades 6-8).<sup>148</sup> Six studies did not report on race or ethnicity.<sup>146,149,151-154</sup> Among those that reported on race or ethnicity, one U.S.-based study included roughly 40 percent non-Hispanic white and 60 percent non-Hispanic black students.<sup>147</sup> The other two Dutch studies were also mixed-race studies, with one including roughly 15 percent Dutch; 31 percent Moroccan; and 55 percent Turkish, Surinam, and children of other races.<sup>150</sup> The other one had a large proportion of Moroccan and Turkish participants (Table 9; Appendix E, Evidence Table 14).<sup>148</sup>

### Interventions

All the nine studies include a home and community component like involving parents and the neighboring community in the prevention programs. No studies reported on diet interventions alone. Only one study reported on a physical activity intervention alone, and this had both an educational and physical/environmental component.<sup>150</sup> Eight studies reported having both changes in diet and physical activity and/or other components,<sup>146-149,151-154</sup> with two using an educational component for diet and an educational and physical/environmental component for physical activity,<sup>151,153</sup> three studies using an educational and physical/environmental component for both diet and physical activity,<sup>146,148,152</sup> two using an educational and physical/environmental component for diet and a physical/environmental component for physical activity<sup>147,149</sup>, and the

other one using an educational component for diet and a physical/environmental component for physical activity (Table 10; Appendix E, Evidence Table 15).<sup>154</sup>

**Table 9. Study and participant characteristics of studies based in schools with home and community components**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls†	Mean Age [Range] Years†	Grade†	Race†
Angelopoulos, 2009 <sup>146</sup>	Y	N	Greece	NR	NR	NR	NR	646	65-73	55.7	10.3	5	NR
De Coen, 2012 <sup>149</sup>	Y	Y	Belgium	NR	3-6	Pre- primary-1	NR	3,241	104	50	NR	NR	NR
de Meij, 2010 <sup>150</sup>	N	N	Netherlands	NR	NR	3-8	NR	2,829	34-86	49.6	8.5	NR	Mixed, Dutch, Moroccan, Turkish, Surinam
Greening, 2011 <sup>147</sup>	Y	Y	U.S.	NR	NR	NR	NR	450	34	48	8.3	NR	WNH, 40 % BNH, 60%
Jansen, 2011 <sup>148</sup>	Y	N	Netherlands	NR	6-12	3-8	NR	2,622	39	Grades 3-5, 50 Grades 6-8, 50	Grades 3-5, 7.7 Grades 6-8, 10.8	Grades 3-5, Arm 1: 52.7, Arm 2: 53; Grades 6-8, Arm 1: 47.3, Arm 2: 47	Mixed, Dutch, Moroccan, Turkish, Surinam
Millar, 2011 <sup>152</sup>	N	Y	Australia	NR	12-18	Secondary school	NR	2,054	NR	46.5	14.6 (1.42)	NR	NR
Naul, 2012 <sup>153</sup>	N	Y	Germany, Netherlands	NR	NR	NR	NR	557	208	NR	NR	NR	NR
Sanigorski, 2008 <sup>151</sup>	N	Y	Australia	NR	4-12	NR	NR	1,807	104-156	51	8.3	NR	NR
Tomlin, 2012 <sup>154</sup>	N	Y	Canada	NR	NR	4-12	NR	148	28	NR	NR	NR	NR

AIAN = American Indian/Alaska Native; API = Asian Pacific Islander; BMI = Body Mass Index (in kg/m<sup>2</sup>); BNH = Black Non-Hispanic; BP = Blood Pressure; CVD = Cardio Vascular Disease; Maint = Maintenance; Meds = Medications; N = No; NR = Not Reported; physical activity = Physical Activity; RCT = Randomized Controlled Trials;

WNH = White Non-Hispanic; Y = Yes

\*Inclusion/exclusion criteria

†Participant characteristics

Note: Weight outcomes were reported based on Johnson, 2012<sup>155</sup> for Sanigorski, 2008.<sup>151</sup>

**Table 10. Interventions of studies based in schools with home and community components**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Angelopoulos, 2009 <sup>146</sup>	Usual care	A student workbook and teacher manual which covered themes related to self-esteem, body image, nutrition, physical activity, fitness and environmental issues.	X	X	X	X
De Coen, 2012 <sup>149</sup>	Usual care	Intervention based on the socio-ecological model in health promotion programs. Multi-topic intervention specifically based on 'Nutrition and physical Activity Health Targets' of the Flemish Community.	X	X		X
de Meij, 2010 <sup>150</sup>	Usual care	Offering recurrent breaks for PA, relaxation and posture exercises, during regular lessons; structural and easily accessible school sports activities. Parental information services.			X	X
Greening, 2011 <sup>147</sup>	Usual care	Family and school-based informational events that alternated between nutrition and physical activities/contest. Health curriculum and intervention program	X	X		X
Jansen, 2011 <sup>148</sup>	Usual care	Targets individual behaviors as well as school policies and curriculum. Parent Involvement. Local sports clubs were involved in providing some of the PE classes and PA activities outside of school hours.	X		X	X
Millar, 2011 <sup>152</sup>	Usual care	It's Your Move Project: Use of social marketing to promote healthy eating, offering refillable water bottles at school and removing soda machines, labeled school food based on healthiness, provided recipe books . Promoted active transport to and from school, increased participation in organized sports or other recreation, and provided education sessions regarding sports. acceptance of healthy body size and shape	X	X	X	X
Naul, 2012 <sup>153</sup>	Usual care	Multi-component program involving physical activity, nutritional lessons, etc. Home involvement of family, parents, and home life	X		X	X
Sanigorski, 2008 <sup>151</sup>	Usual care	Community capacity-building program promoting healthy eating, physical activity and healthy weight	X	X	X	X
Tomlin, 2012 <sup>154</sup>	baseline	Lessons on healthy eating and physical activity as well as extra physical activity sessions Promote family events	X			X

Psych = psychosocial intervention; Phys/Env = Physical/environmental intervention

## Outcomes

### Diet Interventions

None reported.

### Physical Activity Interventions

One study used a physical activity intervention.<sup>150</sup>

## Weight-Related Outcomes

### BMI

The study found an nonsignificant difference between the intervention and control in BMI in favor of the control (beta=0.07 kg/m<sup>2</sup>, 95% CI: -0.02 to 0.16 kg/m<sup>2</sup>) (Appendix E, Evidence Table 16a).<sup>150</sup>

### Waist Circumference

The study found a statistically nonsignificant difference between the intervention and control in waist circumference in favor of the control (beta=0.3 cm, 95% CI: -0.15 to 0.75 cm) (Appendix E, Evidence Table 16a).<sup>150</sup>

### Clinical Outcomes

None reported.

### Adverse Events

None reported.

## Intermediate Outcomes

The study<sup>150</sup> found a significant difference between the intervention and control in organized sports participation (OR=2.8, 95% CI 2.18 to 3.62) and positive but nonsignificant improvements for physical activity (beta=40 counts/min, 95% CI -27 to 106 counts/min) and shuttle run (beta=0.02 laps, 95% CI -0.26 to 0.29 laps) (Appendix E, Evidence Table 16b).

## Interpretation

We can make no conclusions. One study reported a nonsignificant change in BMI in favor of the control.<sup>150</sup> Based on the evidence, physical activity interventions did not significantly change weight outcomes over a period of 2 school years, as this study did not specifically target weight gain prevention but rather sports participation and aerobic fitness (which have improved significantly), thus it did not attempt to modify other risk factors for childhood obesity, such as energy intake.

## Diet and Physical Activity Interventions

We identified eight studies on diet and physical activity interventions.<sup>146-149,151-154</sup> Six of them reported on BMI and BMI z-score,<sup>148,149,151-154</sup> among these two studies showed significant desirable effect.<sup>151,152</sup>



## Weight-Related Outcomes

### BMI z-Score

Five studies reported on BMI z-score.<sup>146,149,151,152,154</sup> Two of them found a statistically significant difference between the intervention and control in BMI z-scores ( $p=0.04$  or  $0.03$ ),<sup>151,152</sup> while the other three found a nonsignificant difference between the intervention and control groups in favor of the intervention<sup>146,149,154</sup> (Appendix E, Evidence Table 17a,b).

### BMI

Six studies reported on BMI.<sup>146-148,151-153</sup> Two studies found a significant difference between the intervention and control and were in favor of the intervention ( $p=0.03$  or  $0.06$ ),<sup>151,152</sup> while another one with a pre-post study design reported a significant rise in BMI in followup measures as compared to baseline ( $p<0.001$ ).<sup>153</sup> One reported by subgroups and found a positive but nonsignificant improvement in BMI for grades 3-5 (mean difference= $0.10$  kg/m<sup>2</sup>, 95% CI:  $-0.22 - 0.03$  kg/m<sup>2</sup>), and almost no improvements for grades 6-8 (mean difference= $0.03$  kg/m<sup>2</sup>, 95% CI:  $-0.12-0.17$  kg/m<sup>2</sup>)<sup>148</sup> Another two studies found a positive but nonsignificant difference between the intervention and control in BMI (Appendix E, Evidence Table 17a,b).<sup>147,151</sup>

### BMI Percentiles

One study reported on BMI percentiles and found a desirable but nonsignificant effect (Appendix E, Evidence Table 17a, b).<sup>147</sup>

### Prevalence of Obesity or Overweight

Two studies reported on the prevalence of obesity or overweight.<sup>148,152</sup> One study found a significant desirable difference between the intervention and control in the prevalence of overweight for grades 3-5 (OR= $0.53$ , 95% CI:  $0.36-0.78$ ), but no improvements for grades 6-8 (OR= $1.25$ , 95% CI:  $0.79-1.99$ ).<sup>148</sup> The other one found an expected but nonsignificant difference between the intervention and control in the prevalence of obesity or overweight ( $p=0.12$ ) (Appendix E, Evidence Table 17a,b).<sup>152</sup>

### Percent Body Fat

Two studies reported on body fat percentage. One found a significant difference between the intervention and control in body fat percentage in favor of the intervention ( $p=0.02$ ),<sup>147</sup> and the other found a favorable but nonsignificant intervention effect ( $p=0.58$ )<sup>152</sup> (Appendix E, Evidence Table 17a,b).

### Waist Circumference

Three studies reported on waist circumference.<sup>147,148,151</sup> One study reported by subgroups and found a significant difference between the intervention and control for grades 3-5 in favor of the intervention (difference in mean change= $-1.29$  cm, 95% CI:  $-2.16 - -0.42$  cm), as well as an expected although nonsignificant difference between the intervention and control for grades 6-8 (difference in mean change= $-0.71$  cm, 95% CI:  $-1.72 - 0.29$  cm).<sup>148</sup> One study<sup>147</sup> found a favorable but nonsignificant difference between the intervention and control ( $p=0.92$ ). The other study found a statistically significant difference between the intervention and control in favor of the intervention ( $p<0.05$ ) (Appendix E, Evidence Table 17a,b).<sup>151</sup>

## **Weight**

Three studies reported on body weight.<sup>151,152,157</sup> Two studies<sup>151,152</sup> found a significant desirable intervention effect ( $p=0.03$  or  $0.04$ ), while the other found a favorable but nonsignificant difference between the intervention and control groups ( $p=0.124$ )<sup>146</sup> (Appendix E, Evidence Table 17a,b).

## **Weight/Height Ratio**

One study reported weight/height ratio and found a significant intervention effect ( $p=0.01$ ) (Appendix E, Evidence Table 17a, b).<sup>151</sup>

## **Clinical Outcomes**

Two studies reported on change in clinical outcomes,<sup>146,154</sup> One study found a significant difference between the intervention and control in systolic and diastolic blood pressures in favor of the intervention ( $p=0.016$  for systolic and  $p=0.005$  for diastolic blood pressure).<sup>146</sup> The other study with a pre-post study design found an increase in systolic blood pressure z-scores ( $p=0.076$ ) and a decrease in diastolic blood pressure z-scores ( $p=0.267$ ), but both were nonsignificant (Appendix E, Evidence Table 17c).<sup>154</sup>

## **Adverse Events**

A single study reported on potential adverse events.<sup>151</sup> The study examined a number of safety measures and concluded that the intervention did not increase the proportion of children participating in behaviors that would put them at increased risk of eating disorders ( $p$ -value not reported). Specifically, the intervention did not increase the prevalence of thinness/underweight (intervention: 3.1 percent at baseline to 3.6 percent at followup, comparison: 2.2–2.4 percent, not significant) (Appendix E, Evidence Table 17d).<sup>151</sup>

## **Intermediate Outcomes**

### **Physical Activity and Sedentary Behavior**

Seven studies reported on changes in physical activity.<sup>149-152,154</sup> Two studies reported on a combination of diet, physical activity, and self-management and found a significant desirable effect on physical activity levels ( $p=0.04$  or  $0.041$ ).<sup>146,147</sup>

Three studies reported on a combination of diet and physical activity and found an undesirable intervention effect; one study was statistically significant ( $p=0.01$ )<sup>152</sup> and the other two were not ( $p=0.555$  or not reported).<sup>149,154</sup> Two studies reported a favorable but nonsignificant intervention effect ( $p$ -value not reported).<sup>150,151</sup>

Three studies reported on a combination of diet and physical activity reported on changes in sedentary behavior.<sup>149,151,152</sup> One study found an unexpected but significant intervention effect ( $p=0.001$ ),<sup>152</sup> one found a desirable intervention effect with unknown significance,<sup>151</sup> while the other one found no difference in change in sedentary behavior between the intervention and control groups (Appendix E, Evidence Table 17e).<sup>149</sup>

### **Dietary Intake**

We identified nine studies that examined dietary intake. One study reported on change in calorie intake, which showed no significant desirable effect. Five studies reported on change in fruit and vegetable intake. One of these, which intervened on a combination of diet, physical activity and self-management, showed significant desirable effect. Three studies reported on

change in fatty food intake. Of these, two that intervened on a combination of diet, physical activity and self-management showed significant desirable effect. Five studies reported on change in sugar-sweetened beverage intake, and one of them showed significant desirable effect, which intervened on a combination of diet, physical activity and self-management. Seven studies reported on change in physical activity levels, and two of them showed significant desirable effect, which both intervened on a combination of diet, physical activity and self-management. Three studies reported on change in sugar-sweetened beverage intake, and none showed significant desirable effect.

Only one study, examining a combination of diet and physical activity, reported on change in calorie intake and found a nonsignificant difference in calorie intake between the intervention and control in favor of the intervention ( $p=0.159$ ).<sup>154</sup>

Five studies reported on change in fruit and vegetable intake.<sup>146,149,151,152,154</sup> Four studies found a favorable intervention effect,<sup>146,149,151,154</sup> however, in three of the studies examining a combination of diet and physical activity, the findings were either nonsignificant or the studies did not report on significance.<sup>149,151,154</sup> Only one study, examining a combination of diet, physical activity, and self-management, showed significant desirable effect ( $p=0.044$ ).<sup>146</sup> The last study reported on a combination of diet and physical activity and found an undesirable intervention effect in fruit and vegetable intake ( $p=0.14$ ).<sup>152</sup>

Three studies reported on change in fatty foods intake. Two studies reported on a combination of diet, physical activity, and self-management and found a significant desirable effect ( $p=0.0005$  or  $0.028$ ).<sup>146,147</sup> The other study reported on a combination of diet and physical activity and found a nonsignificant difference in fatty foods intake between the intervention and control in favor of the intervention ( $p=0.054$ ).<sup>154</sup>

Five studies reported on change in sugar-sweetened beverage intake.<sup>146,149,151,152,154</sup> One study reported on a combination of diet, physical activity, and self-management and found a significant desirable effect on sugar-sweetened beverage intake ( $p=0.039$ ).<sup>146</sup> Three studies reported on a combination of diet and physical activity and found an undesirable intervention effect,<sup>149,152,154</sup> while the other study reported on a combination of diet and physical activity and found a favorable intervention effect in sugar-sweetened beverage intake,<sup>151</sup> however, it did not report the p-value.

## Interpretation

The results from an outcome measure from each of the eight studies reporting on combined diet and physical activity interventions support our conclusions. Five studies reported on BMI z-score.<sup>146,149,151,152,154</sup> All reported changes in BMI z-score in favor of the intervention. Two studies were significant,<sup>151,152</sup> and the remaining three reported a nonsignificant change.<sup>146,149,154</sup> Three studies reported on BMI.<sup>147,148,153</sup> One reported a nonsignificant change in BMI in favor of the intervention.<sup>147</sup> One reported a nonsignificant change in BMI in favor of the intervention for grades 3-5, but almost no improvements for grades 6-8.<sup>148</sup> Another pre-post study found a significant rise in BMI in followup measures as compared to baseline disfavor of the intervention.<sup>153</sup> Based on this evidence, we conclude that studies on combined diet and physical activity interventions in a school, home, and community setting generally showed positive but nonsignificant improvements in weight outcomes over a period of at least 6 months because the majority of these studies specifically targeted weight gain prevention; all included both dietary and physical activity components focusing both on education and making structural changes to promote diet and physical activity. One reason for the nonsignificant effect of some of the

interventions on weight outcomes might be that the interventions did not specifically target weight gain prevention, or the sample size was too small to detect a significant effect.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of evidence is insufficient that school-home-community based interventions that only attempt to change physical activity can prevent obesity or overweight in children, as there was only one study with moderate risk of bias. The strength of evidence is high that interventions which use a combination of interventions (e.g., diet, physical activity, and/or self-management) can prevent obesity or overweight in children, as both a study with low risk of bias and the majority of studies with moderate risk of bias showed a favorable effect (Table 11; Appendix F, Strength of Evidence Table 1).

### **Intermediate Outcomes**

There was insufficient evidence to grade calorie or fatty foods intake in interventions that included a combination of diet and physical activity approaches in a school-home-community setting, as there was only one study with moderate risk of bias. The strength of evidence is low to grade changes in sugar-sweetened beverage intake, physical activity levels, or sedentary behaviors for interventions trying to impact both diet and physical activity, as there were a few studies with low or moderate risk of bias and they showed conflicting results. The strength of evidence is moderate that diet and physical activity approaches impact fruit and vegetable intake in a school-home-community setting, as both a study with low risk of bias and another study with moderate risk of bias showed a favorable effect (and there were no low or moderate risk of bias studies going in the other direction).

The strength of evidence is insufficient that interventions which included diet, physical activity, and self-management impact fruit and vegetable intake or sugar-sweetened beverage intake in a school-home-community setting, as there was only one study with moderate risk of bias in this category. The strength of evidence is moderate that interventions which included diet, physical activity, and self-management impact fatty foods intake or physical activity levels in a school-home-community setting, as there were only two studies with a moderate risk of bias that both reported a favorable intervention effect (Appendix F, Strength of Evidence Tables 2-7).

**Table 11. Summary of the strength of evidence for weight-related outcomes in studies taking place in schools with a home and community component**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
School-Home-Community	PA,1	2010	2,829	0/1/0	0	0	Moderate	NA	Precise	Direct	Insufficient
	C,8	2008-2012	11,525	1/4/3	12.5	81	Moderate	Consistent	Imprecise	Direct	High

## School-Community–Based Studies

### Study Characteristics

We included six school/community-based studies including three RCTs<sup>158-160</sup> and three non-RCTs (Table 12; Appendix E, Evidence Table 18).<sup>161-163</sup> The stated goal in four studies was obesity prevention or weight maintenance.<sup>158,160,161,163</sup> Three studies took place in the U.S.,<sup>159,160,162</sup> one in Germany,<sup>158</sup> one in Canada,<sup>161</sup> and the other one in New Zealand.<sup>163</sup> Two studies did not list any inclusion criteria.<sup>161,162</sup> One included only English-speaking girls from one public middle school (grade 6).<sup>159</sup> One included kindergarten to Grade 2 Latinos.<sup>160</sup> One included only children aged 9 to 13 years.<sup>163</sup> The other study included children (grades 2 to 3) from elementary schools in socially deprived neighborhoods of two cities in Germany (Table 12; Appendix E, Evidence Table 18).<sup>158</sup>

### Population Characteristics

The six studies enrolled 10,087 children. Two studies did not report the distribution of gender,<sup>160,161</sup> one included only girls,<sup>159</sup> and the other three studies included 48.0 to 51.6 percent girls.<sup>158,162,163</sup> Two studies did not report age,<sup>160,163</sup> one study did not report age but included only children from grade 6,<sup>159</sup> the remaining three studies enrolled children from elementary school.<sup>158,161,162</sup> Only one study reported on race or ethnicity, and included 46 percent white children, 24 percent black children, 12 percent Hispanic children, and 18 percent children of other races or with unknown race,<sup>159</sup> another two studies also included a sample of mixed races/ethnicities (Table 12; Appendix E, Evidence Table 19).<sup>162,163</sup>

### Interventions

Out of six studies, one reported on diet, one on physical activity, and the remaining four reported on a combination of diet and physical activity. One study reported on a diet intervention<sup>158</sup> that included both educational and physical/environmental components to alter diet. Two studies reported on both diet and physical activity components and used both an educational and physical/environmental approach.<sup>161,163</sup> One intervention attempted to modify diet from both a psychosocial and physical/environmental approach, and attempted to modify physical activity from a psychosocial approach.<sup>162</sup> Another study included three active arms, with each arm attempting to modify both diet and physical activity: one used a psychosocial approach, another used a physical/environmental approach, and the final arm used both approaches.<sup>160</sup> Another study included physical activity (both educational and physical/environmental) interventions and self-management (Table 13; Appendix E, Evidence Table 20).<sup>159</sup>

**Table 12. Study and participant characteristics of studies based in schools with a community component**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls <sup>†</sup>	Mean Age [Range] Years <sup>†</sup>	Grade <sup>†</sup>	Race <sup>†</sup>
Crespo, 2012 <sup>160</sup>	Y	Y	U.S.	NR	NR	K-2	Latino	820	156	NR	NR	NR	NR
Macaulay, 1997 <sup>161</sup>	N	Y	Canada	NR	NR	NR	NR	537	156	NR	[6-11]	1-6	NR
Madsen, 2009 <sup>162</sup>	N	N	U.S.	NR	NR	NR	NR	178	34	48	9.8 (7.9- 12.2)	3-5	Mixed, White, Black, Latino/Hispanic, Asian/Pacific Islander, Other/unknown
Muckelbauer, 2009 <sup>158</sup>	Y	Y	Germany	NR	NR	2-3	NR	2,950	47	49.8	Arm 1: 8.3 Arm 2: 8.3	2-3	NR
Utter,2011 <sup>163</sup>	N	Y	New Zealand	NR	9-13	NR	NR	3,881	104	51.6	NR	NR	Mixed, Asian/Pacific Islander, Pacific, Maori, European
Webber, 2008 <sup>159</sup>	Y	NR	U.S.	Girls	NR	6	NR	1,721	156	100	NR	6	WNH: 46.1%; BNH: 23.5%; Latino/Hispanic: 12.3%; Multi- ethnic, or missing: 18.0%

BNH = Black non-Hispanic; N = no; NR = not reported; RCT = randomized controlled trials; WNH=White non-Hispanic; Y = yes

\*Inclusion/exclusion criteria.

<sup>†</sup>Participant characteristics.

**Table 13. Interventions of studies based in schools with a community component**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Crespo, 2012 <sup>160</sup>	Usual care	Intervention delivered by a community health advisor through home visit focused on increasing fruit, vegetable, and water consumption, increasing active play and decreasing sugar-sweetened beverages and TV viewing	X		X	
	Usual care	Implementation and improvement of cafeteria salad bars. School playground improvement Improvement of community park Health Informatics:		X		X
	Usual care	Intervention delivered by a community health advisor through home visit focused on increasing fruit, vegetable, and water consumption. School playground improvement . Improvement of community park.	X	X	X	X
Macaulay, 1997 <sup>161</sup>	Usual care	Storytelling, games, food tasting, experiments, puppet shows, crafts, and audiovisual presentations to promote healthy eating. Emphasizes the benefits and pleasure of daily physical activity and the different types of activity: aerobic, strength building, and flexibility	X		X	
Madsen, 2009 <sup>162</sup>	Usual care	Play soccer three days a week Literacy improvement: participants perform community service or undertake creative writing the remaining two days a week.			X	
Muckelbauer, 2009 <sup>158</sup>	Usual care	Combined environmental and educational intervention solely promoting water consumption	X	X		

Psych = psychosocial intervention; Phys/Env = Physical/environmental intervention



## **Outcomes**

### **Diet Intervention**

Two articles (representing one study) investigated the impact of diet interventions on childhood obesity prevention.<sup>158,164</sup>

### **Weight-Related Outcomes**

#### **BMI**

The study significantly lowered BMI in the intervention group versus in the control group after intervention ( $p=0.037$ ). There was no significant difference before intervention (Appendix E, Evidence Table 21a).<sup>158</sup>

#### **Prevalence of Obesity or Overweight**

A primary study found significant improvements in the intervention group versus in the control group, as the incidence rate for obesity was significantly lower in the intervention group ( $p=0.018$ ). The remission rate (previously overweight or obese to normal weight) for obesity or overweight was also higher in the intervention group but did not reach statistical significance ( $p=0.485$  or  $0.251$ ) (Appendix E, Evidence Table 21a).<sup>158</sup>

Stratified results in another study, based on immigration backgrounds,<sup>164</sup> found significant improvements in the incidence of overweight ( $p=0.006$ ) and positive but nonsignificant improvements in the remission rate ( $p=0.11$ ) in the non-immigrant group immigrants; and positive but nonsignificant improvements in the incidence rate of overweight ( $p=0.99$ ) and no improvements in the remission rate ( $p=0.23$ ) in the immigrant group.

### **Clinical Outcomes**

None reported.

### **Adverse Events**

None reported.

### **Intermediate Outcomes**

#### **Dietary Intake**

The study found significant improvements in water and soft drinks/juices consumption post intervention ( $p<0.001$  and  $p=0.019$ ) in the intervention but not in the control ( $p=0.576$  and  $p=0.670$ ).<sup>158</sup>

Another study reported on immigrant and non-immigrant subgroups.<sup>164</sup> Water consumption had improved significantly in both subgroups, with positive but nonsignificant improvements in juice consumption and no improvements in soft drinks consumption in both subgroups (Appendix E, Evidence Table 21b).

### **Interpretation**

The results of the outcomes measures in one study reporting the effect of diet intervention on BMI and prevalence of overweight and obesity support our conclusions. The one study reported on a statistically significant change in BMI in favor of the intervention.<sup>158</sup> Based on the evidence,

we conclude that this diet intervention showed significant improvements in BMI and prevalence of overweight and obesity over a period of 47 weeks because it specifically targeted weight gain prevention and the sample size was as big as 2,950.

## **Physical Activity Intervention**

### **Weight-Related Outcomes**

#### **BMI**

A single study reported no improvements for BMI (p-value not reported) (Appendix E, Evidence Table 22a).<sup>159</sup>

#### **Percent Body Fat**

One study reported no improvements for percent body fat (p-value not reported) (Appendix E, Evidence Table 22a).<sup>159</sup>

#### **Skinfold Thickness**

A study found positive but nonsignificant improvements for triceps skinfold thickness (p-value not reported) (Appendix E, Evidence Table 22a).<sup>159</sup>

#### **Weight**

This study found positive but nonsignificant improvements for body weight (p-value not reported) (Appendix E, Evidence Table 22a).<sup>159</sup>

#### **Clinical Outcomes**

None reported.

#### **Adverse Events**

None reported.

### **Intermediate Outcomes**

#### **Physical Activity and Sedentary Behavior**

This study measured physical activity using multiple scales. Change in minutes of moderate to vigorous physical activity, and change in minutes of total physical activity were positive but nonsignificant. Change in sedentary behavior was also positive but nonsignificant (p-value not reported) (Appendix E, Evidence Table 22b).<sup>159</sup>

#### **Interpretation**

We can make no conclusions regarding the effect of a physical activity intervention on BSI. The one study reported no change in BMI.<sup>159</sup> Based on the evidence, this physical activity intervention among girls showed no improvements in weight outcomes over a period of 3 years because it did not specifically target weight gain prevention, and the effect may have faded over 3 years.

## **Diet and Physical Activity Intervention**

We identified four studies.<sup>160-163</sup>

## **Weight-Related Outcomes**

### **BMI z-Score**

Three studies measured the impact of diet and physical activity interventions on BMI z-scores.<sup>160,162,163</sup> The intervention was effective in reducing BMI z-scores in two studies but both were nonsignificant,<sup>160,162</sup> another pre-post study reported nonsignificant increase in followup compared to baseline (p=0.13) (Appendix E, Evidence Table 23a,b).<sup>163</sup>

### **BMI**

Three studies in this setting measured the impact of diet and physical activity interventions on BMI.<sup>161-163</sup> The intervention was effective in reducing BMI in two studies,<sup>161,162</sup> with one reporting significant improvements (p<0.01).<sup>161</sup> Another pre-post study reported nonsignificant increase in followup compared to baseline (p=0.18) (Appendix E, Evidence Table 23a,b).<sup>163</sup>

### **Prevalence of Overweight and Obesity**

Once study reported on prevalence of obesity and found that it declined from 33 percent at baseline to 27 percent at followup (p = 0.103) (Appendix E, Evidence Table 23a,b).<sup>162</sup>

### **Percent Body Fat**

Once study reported on percent body fat and found a nonsignificant difference between the intervention and control in favor of the control (p = 0.16) (Appendix E, Evidence Table 23a,b).<sup>163</sup>

### **Skinfold Thickness**

One study reported on triceps skinfold thickness and sub-scapular skinfold thickness and found a significant desirable effect in favor of the intervention (p-value not reported) (Appendix E, Evidence Table 23a,b).<sup>161</sup>

### **Weight**

One study reported on weight and found a nonsignificant difference between the intervention and control in favor of the control (p = 0.21) (Appendix E, Evidence Table 23a,b).<sup>163</sup>

### **Clinical Outcomes**

None reported.

### **Adverse Events**

None reported.

## **Intermediate Outcomes**

### **Physical Activity and Sedentary Behavior**

Two studies reported on changes in physical activity levels, with one reporting a desirable but nonsignificant intervention effect (p=0.61),<sup>160</sup> and the other finding no effect (p=0.65).<sup>163</sup> Two studies reported on sedentary behavior, both found a desirable but nonsignificant effect (p=0.58 and p=0.09) (Appendix E, Evidence Table 23c).<sup>160,163</sup>

## **Dietary Intake**

One study reported on changes in fruit and vegetable intake and showed a favorable but nonsignificant intervention effect ( $p=0.75$ ).<sup>160</sup> One study reported on changes in sugar-sweetened beverage intake and found a favorable but nonsignificant effect ( $p=0.42$ ) (Appendix E, Evidence Table 23c).<sup>163</sup>

## **Interpretation**

The results from an outcome measure from each of the four studies support that combined diet physical activity interventions generally showed positive but nonsignificant improvements in weight outcomes over a period of at least 6 months because the sample size was usually too small (e.g. 178 participants in one study).. Three studies reported on BMI z-scores.<sup>160,162,163</sup> Two studies reported changes in BMI z-score in favor of the intervention and both were nonsignificant.<sup>160,162</sup> One pre-post study reported changes in BMI z-score from baseline to followup disfavor of the intervention.<sup>163</sup> One study reported on BMI and reported a significant change in favor of the intervention.<sup>161</sup>

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of evidence is insufficient that a solely diet or physical activity approach can impact weight outcomes in a school and community setting as only one study addressed each. The strength of evidence is moderate that combined diet and physical activity approaches prevent overweight or obesity in a school and community setting, as the two studies with moderate risk of bias showed a favorable effect and there was no other low risk of bias studies in the opposite direction. Three of these four studies showed a desirable intervention effect, while only one of them was statistically significant (Table 14; Appendix F, Strength of Evidence Table 1).

### **Intermediate Outcomes**

The strength of evidence is insufficient that diet and physical activity approaches impact fruit and vegetable intake or sugar-sweetened beverage intake in a community/school-based setting as there was only one study in this category. The strength of evidence is low that diet and physical activity approaches impact physical activity or sedentary behaviors in a community/school-based setting as there was only one study with moderate risk of bias that reported a favorable effect and the other one was a study with high risk of bias. The strength of evidence is low that interventions which included physical activity and self-management impact BMI in a community/school-based setting as there were only two studies with high risk of bias that reported a desirable effect (Appendix F, Strength of Evidence Tables 4-7).

**Table 14. Summary of the strength of evidence for weight-related outcomes in studies taking place in schools with a community component**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(n)	% With Favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
School-Community	D,1	2009	2,950	0/1/0	100	100	Moderate	NA	Precise	Direct	Insufficient
	PA,1	2008	1,721	0/0/1	0	0	High	NA	Imprecise	Direct	Insufficient
	C,4	1997-2012	3,017	0/2/2	25	75	Moderate	Consistent	Imprecise	Direct	Moderate

D = diet intervention; PA = physical activity intervention; C = combination of diet and physical activity interventions

## School-Consumer Health Informatics–Based Studies

### Study Characteristics

We included four studies.<sup>165-168</sup> One study used a quasi-experimental design<sup>165</sup> and the other studies were RCTs.<sup>166-168</sup> Two of the studies stated weight maintenance as the goal of the interventions and took place in the Netherlands.<sup>167,168</sup> One study took place in the U.S.<sup>166</sup> Three of the four studies listed grade level as inclusion criteria. One study included participants in grades 4 and 5,<sup>166</sup> another study included participants in grades 10 and 11,<sup>165</sup> and a third study included participants in the first year of secondary school (Table 15, Appendix E, Evidence Table 24).<sup>167</sup>

### Population Characteristics

The number of participants in the four included studies was 3,231 children.<sup>165-168</sup> In the four studies the total followup period reported for participants ranged between 26 to 114 weeks. Three studies reported mean age<sup>165,167,168</sup> and it ranged between 12.6 to 15.04 years. One study included only girls<sup>165</sup> and the percent girl participants ranged from 41.1 percent to 50.3 percent in two other studies.<sup>167,168</sup> All children in one study were in grades 4 and 5<sup>166</sup> while participants in another study were in grades 10 and 11.<sup>165</sup> In one study, 57 percent of participants were white, 20 percent were Latino/Hispanic, and 17 percent were Asian/Pacific Islander. In another study<sup>167</sup> 82.3 percent of participants were classified as Western and 17.7 percent of participants as Non-Western. In a third study reporting race, 66 to 78.9 percent of participants were Western and 21.1 to 34 percent of participants were Non-Western (Table 15, Appendix E, Evidence Table 25).<sup>168</sup>

### Interventions

Two studies reported on physical activity interventions.<sup>165,167</sup> One study described an intervention consisting of supervised in-class activity, health education, and Internet-based self-monitoring components.<sup>165</sup> This intervention lasted 30 weeks and aimed to increase levels of physical activity. Participants received 60-minute long educational discussions once a week related to the health benefits of exercise and strategies for adopting an active lifestyle. Student input influenced activity choices, which included a variety of aerobic and strength-building activities. Participants reported physical activity via Internet-based self-monitoring. Another study<sup>167</sup> reported on a 3-week web-based intervention that promoted physical activity among participants. Individuals in both intervention arms received school-based online lessons focused on improving physical activity and goal setting. Additionally, participants randomized to the YouRaction+e arm received computer-assisted feedback on the availability of physical activity facilities in their residential neighborhoods (Table 16, Appendix E, and Evidence Table 26).<sup>165,167</sup>

Two studies reported on diet and physical activity interventions.<sup>166,168</sup> One study<sup>166</sup> randomized participants to attend the multidisciplinary Wellness, Academics and You program for 1 school year. The intervention consisted of a five-module program intended to develop their health attitudes and behavior addressing nutrition, physical activity, and self-management. The intervention group participated in a variety of activities integrated into their core curriculum. Activity duration ranged from 20 minutes to more than 1 hour. Another study<sup>168</sup> reported on a 10-week Web-based intervention that aimed to promote healthy diet, increase physical activity, and reduce sedentary behavior. Participants also received lessons focused on weight

management, goal setting, and behavioral feedback (Table 16, Appendix E, and Evidence Table 26).<sup>166,168</sup>

**Table 15. Study and participant characteristics of studies based in schools with a consumer health informatics component**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls†	Mean Age [Range] Years†	Grade†	Race†
Schneider, 2007 <sup>165</sup>	N	N	NR	NR	NR	10-11		122	30	100	15.04	NR	WNH: 57%  Latino/ Hispanic: 20%  API: 17%
Spiegel, 2006 <sup>166</sup>	Y	N	U.S.	NR	NR	4-5		1,013	34	NR	NR	4-5	NR
Prins, 2012 <sup>167</sup>	Y	Y	Netherlands	NR	12-13	First year of secondary school	Attend participating school in the Rotterdam Area	1,213	26	Arm1: 46.6 Arm2: 47.2 Arm3: 49	Arm1: 12.6(0.4) Arm2: 12.7(0.5) Arm3: 12.7(0.5)	NR	Western Overall:(82.3) Arm1:(74.8) Arm2:(77.9)  Non-Western (Overall:(17.7) Arm1:(25.2) Arm2:(22.1)
Ezendam, 2012 <sup>168</sup>	Y	Y	Netherlands	NR	12-13	NR	Secondary school; Participants in 1-5 first year classes	883	114	Arm1: 50.3 Arm2: 41.1	Arm1: 12.6(0.6) Arm2: 12.7(0.7)	NR	Western Arm1:314(78.9) Arm2:320(66.0) Non-Western Arm1:84(21.1) Arm2:165(34.0)

API = Asian Pacific Islander; N = no; NR = not reported; RCT = randomized controlled trials; WNH = White non-Hispanic; Y = yes

\*Inclusion/exclusion criteria.

†Participant characteristics.



**Table 16. Interventions of studies based in schools with a consumer health informatics component**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Ezendam, 2012 <sup>168</sup>	Usual care	Web-based computer lessons conducted by teacher with a health informatics computer-tailored intervention	X		X	
Prins, 2012 <sup>167</sup>	Usual care	School based online lessons Web-based computer tailored physical activity promotion intervention			X	
	Usual care	School based online lessons plus feedback on nearby physical activity facilities Web-based computer tailored PA promotion intervention			X	
Schneider, 2007 <sup>165</sup>	Usual care	Increase students' levels of physical activity through supervised in-class activity, health education, and Internet-based self-monitoring			X	X

Psych = psychosocial intervention; Phys/Env = physical/environmental intervention

## **Outcomes**

### **Diet Interventions**

None reported.

### **Physical Activity Intervention**

Two studies evaluated the effect of a physical activity intervention on weight outcomes.<sup>165,167</sup> One quasi-experimental study included only adolescent girls<sup>165</sup> and the other study<sup>167</sup> randomized adolescents to a control or one of two intervention groups.

### **Weight-Related Outcomes**

#### **BMI Percentile**

One study reported a small increase in BMI over time in the intervention group, compared to the control group. (Appendix E, Evidence Table 27).<sup>165</sup>

#### **Prevalence of Overweight and Obesity**

One study reported no statistically significant difference between either intervention group and control in percent overweight or obese (Evidence Table 27).<sup>167</sup>

#### **Percent Body Fat**

One study reported no difference between the intervention and control in percent body fat over time. (Appendix E, Evidence Table 27)<sup>165</sup>

#### **Waist Circumference**

One study reported no statistically significant difference between either intervention group and control in waist circumference (Evidence Table 27).<sup>167</sup>

### **Clinical Outcomes**

One study measured peak oxygen consumption and VO2 peak (L/min).<sup>165</sup> Peak oxygen consumption increased in the intervention group; this was a significant difference between the intervention and control ( $p=0.001$ ). VO2 peak increased in the intervention group with a p-value of 0.02. (Appendix E, Evidence Table 27).

### **Adverse Events**

None reported.

### **Intermediate Outcomes**

#### **Physical Activity and Sedentary Behavior**

In one study,<sup>167</sup> there was no statistically significant difference between either intervention group and control in minutes of moderate-to-vigorous physical activity or compliance with moderate-to-vigorous physical activity guidelines (Evidence Table 27).<sup>167</sup>

### **Interpretation**

The results from an outcome measure from each of the two studies reporting on physical activity interventions support our conclusions--none of the school with consumer health

informatics physical activity interventions showed a significant beneficial effect on weight outcomes. One study reported on BMI percentiles and reported a small nonsignificant change in favor of the intervention.<sup>169</sup> The other study reported no statistically significant change in prevalence of overweight or obesity.<sup>167</sup> Based on this evidence we cannot determine if physical activity interventions impact BMI percentiles or prevalence of overweight and obesity.

These studies may be limited by exclusion of concurrent nutrition education and short followup. Additional factors that may have limited the realization of an intervention effect in one of the studies<sup>165</sup> include use of a non-randomized study design.

## **Diet and Physical Activity Interventions**

Two studies evaluated the effect of a diet and physical activity intervention on weight outcomes.<sup>166,168</sup> One study randomly assigned 1,013 students in grade 4 and 5 from 69 classes in four states to intervention or control groups.<sup>166</sup> Another study randomized 883 adolescents to an intervention or control group.<sup>168</sup>

## **Weight-Related Outcomes**

### **BMI**

In one study,<sup>166</sup> there was a significant difference between the intervention and control in BMI. The shift in BMI from baseline to after intervention was significant (Pearson correlation coefficient = -0.186, p = 0.01 level) In a second study<sup>168</sup>, there was no intervention effect on BMI at followup (Appendix E, Evidence Table 28a,b).<sup>166,168</sup>

One study<sup>168</sup> reported no intervention effect on BMI among subgroups of overweight or obese children (Appendix E, Evidence Table 28a,b).

### **Prevalence of Overweight and Obesity**

One study<sup>166</sup> reported a notable decrease in the intervention group in the prevalence of obesity, and the decrease was most significant for overweight participants. The study did not statistically analyze this difference in change of the prevalence. In a second study<sup>168</sup> there was no intervention effect on the prevalence (Appendix E, Evidence Table 28a,b).<sup>166,168</sup>

One study<sup>168</sup> reported no intervention effect on prevalence of overweight or obese among subgroups of overweight or obese children (Appendix E, Evidence Table 28a,b).

### **Waist Circumference**

One study<sup>168</sup> reported no intervention effect on waist circumference among overweight or obese children (Appendix E, Evidence Table 28a,b).<sup>168</sup>

### **Clinical Outcome**

None reported.

### **Adverse Events**

None reported.

## **Intermediate Outcomes**

### **Physical Activity and Sedentary Activity**

Two studies addressed change in physical activity. One reported a change in favor of the intervention, but the change was not significant.<sup>168</sup> The other reported a change in favor of the control, but this change was not significant.<sup>166</sup> A third study reported on change in sedentary behavior by measuring changes in screen time (TV, video games). This study reported a change in favor of the intervention but reported no significance values (Appendix E, Evidence Table 28c).<sup>168</sup>

### **Dietary Intake**

In one study, the combined diet and physical activity intervention compared to the control group resulted in higher fruit and vegetable consumption and increased physical activity.<sup>166</sup> The study did not statistically analyze this difference in change in physical activity and fruit and vegetable intake. In another study,<sup>168</sup> compared to the control, the intervention group had lower self-reported snack consumption, were less likely to report drinking more than 400ml of sugar-sweetened beverages per day, and reported more vegetable consumption. While these between-group differences in dietary outcomes were observed at 4-month followup, they were not sustained at the 2-year followup. In this same study there was no significant intervention effect on physical activity (Appendix E, Evidence Table 28c).<sup>166,168</sup>

### **Interpretation**

The results from outcome measures from two studies reporting on combined diet and physical activity interventions support our conclusions-- we cannot determine if combined diet and physical activity interventions impact BMI. These two studies reported on BMI.<sup>166,168</sup> One showed a significant change in favor of the intervention,<sup>166</sup> and the other showed no intervention effect.<sup>168</sup>

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of evidence is insufficient that school with consumer health informatics physical activity interventions prevent obesity or overweight in children. We graded this body as insufficient because it lacked precision and included studies with moderate risk of bias. The strength of evidence is insufficient that combination diet and physical activity interventions prevent obesity or overweight in children. We graded this body as insufficient because it lacked precision and included studies with moderate risk of bias (Table 17, Appendix F, Strength of Evidence Table 1).

### **Intermediate Outcomes**

The strength of evidence is insufficient that school-based physical activity interventions with consumer health informatics change physical activity. The strength of evidence is insufficient that combined diet and physical activity interventions impact changes in sedentary behavior or fruit and vegetable intake. One study each reported on these intermediate outcomes and neither presented precision (Appendix F, Strength of Evidence Tables 4-6).

The strength of the evidence that diet and physical activity interventions impact change in physical activity and change in fruit and vegetable intake is insufficient. Two moderate risk of bias studies with inconsistent results reported on these outcomes and did not report precision (Appendix F).

**Table 17. Summary of the strength of evidence for weight-related outcomes in studies taking place in a school setting with a consumer health informatics component**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable Outcome (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
School-CHI	PA,2	2007-2012	1,335	0/2/0	0	0	Moderate	Inconsistent	Imprecise	Direct	Insufficient
	C, 2	2006-2012	1,896	0/2/0	50	50	Moderate	Inconsistent	Imprecise	Direct	Insufficient

PA = physical activity intervention; C = combination of diet and physical activity interventions; CHI = consumer health informatics; sig = significant

## **School-Home-Consumer Health Informatics–Based Studies**

### **Study Characteristics**

We included only one non-RCT.<sup>170</sup> The goal of the intervention in this study was weight maintenance and the study took place in England. Primary schools were the only inclusion criteria (Table 18; Evidence Table 24).<sup>170</sup>

### **Population Characteristics**

One study included 589 participants followed them over a period of 120 weeks.<sup>170</sup> The mean age for the control group was 8.86 years and for the control group 8.76 years. The study enrolled 94.8 to 96.5 percent white participants and did not report the percentage of girls or the grade level (Table 18; Evidence Table 25).<sup>170</sup>

### **Interventions**

One study reported on a 40-week diet and physical activity intervention.<sup>170</sup> This intervention promoted physical activity through the provision of physical education lessons, and target activities (1 mile run/walk). Additionally, participants received CD-rom based learning exercises on healthy eating and physical activity and along with their families were able to access an interactive website reinforcing key messages of the intervention (Table 19; Evidence Table 26).<sup>170</sup>

**Table 18. Study and participant characteristics of studies based in schools with a home and consumer health informatics component**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls <sup>†</sup>	Mean Age [Range] Years <sup>†</sup>	Grade <sup>†</sup>	Race <sup>†</sup>
Gorely, 2011 <sup>170</sup>	N	Y	England	NR	NR		Primary School	589	120	NR	Arm 1: 8.86 Arm 2: 8.76	NR	NR

N = no; NR = not reported; RCT = randomized controlled trials; Y = yes

\*inclusion/exclusion criteria.

<sup>†</sup>participant characteristics.

**Table 19. Interventions of studies based in schools with a home and consumer health informatics component**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Gorely, 2011 <sup>170</sup>	Usual care	GreatFun2Run: Classroom and physical education sessions Interactive website for parents and children Local media campaign to promote healthy nutrition and Physical activity.	X		X	X

Psych = psychosocial intervention; Phys/Env = physical/environmental intervention



## **Outcomes**

### **Diet Interventions**

None reported.

### **Physical Activity Interventions**

None reported.

### **Diet and Physical Activity Interventions**

One study evaluated the effect of a diet and physical activity intervention on weight outcomes.<sup>170</sup> The study non-randomly assigned 589 students to an intervention or matched control group.<sup>170</sup>

### **Weight-Related Outcomes**

#### **BMI**

There was no significant difference in BMI between the intervention and control groups (Appendix F, Evidence Table 28a).<sup>170</sup>

#### **Percent Body Fat**

Among participants in the intervention group, there was a significant increase in percent body fat compared to the control (Appendix F, Evidence Table 28a,b).<sup>170</sup>

#### **Waist Circumference**

There was no significant difference in BMI between the intervention and control groups (Appendix F, Evidence Table 28a,b).<sup>170</sup>

#### **Clinical Outcome**

None reported.

#### **Adverse Events**

None reported.

#### **Intermediate Outcome**

There was no significant difference between the intervention group and control in minutes per day of moderate-to-vigorous physical activity (Appendix F, Evidence Table 28c).<sup>170</sup>

### **Interpretation**

We can make no conclusions. This study showed no intervention effect of combined diet and physical activity.<sup>170</sup> Based on this evidence we cannot determine if combined diet physical activity interventions impact BMI.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of evidence is insufficient that school, home, consumer health informatics diet and physical activity interventions prevent obesity or overweight in children. We graded this body as insufficient because it included only a single study with high risk of bias. No studies measured adverse events (Table 20, Appendix F, Strength of Evidence Table 1).

### **Intermediate Outcomes**

The strength of the evidence is insufficient that combined diet and physical activity interventions impact change in physical activity. A single high risk of bias study was not sufficient enough evidence to draw a conclusion (Appendix F, Strength of Evidence Table 6).

**Table 20. Summary of the strength of evidence for weight-related outcomes in studies taking place in a school setting with a home and consumer health informatics component**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable Outcome (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
School-Home-CHI	C,1	2011	589	0/0/1	0	0	High	NA	Imprecise	Direct	Insufficient

C = combination of diet and physical activity interventions; CHI = consumer health informatics; sig = significant

## Key Question 2: What is the comparative effectiveness of home-based interventions for the prevention of obesity or overweight in children?

### Key Points

Diet, physical activity and combination (diet and physical activity) interventions did not show any significant impact on weight-related outcomes and the evidence is low, at best, inconclusive that any of these interventions are more effective in preventing obesity or overweight than the control.

### Home-Based Studies

#### Study Characteristics

We included four RCTs, and all were from the U.S.<sup>171-174</sup> Three of the studies reported that preventing obesity was the goal of the intervention.<sup>171,173,174</sup> One study included children greater than 5 years of age.<sup>173</sup> One study included only girls,<sup>172</sup> and two studies based inclusion criteria on a BMI less than the 85<sup>th</sup> percentile (Table 21; Appendix E, Evidence Table 29).<sup>171,172</sup>

#### Population Characteristics

The total number of participants in all four studies was 321. The total followup period ranged from 52<sup>171,173</sup> to 104 weeks.<sup>172</sup> In one study all of the participants were girls<sup>172</sup> and in two other studies<sup>171,174</sup> 50-65 percent of the participants were girls. The age range of the participants in all four studies was 4 to 17 years. Only one of the four studies reported the grade level and participants were preschoolers<sup>174</sup>. One of the four studies described the race of the participants.<sup>174</sup> In this study, 94 percent of the participants were Latin Hispanic, 2 percent Black non-Hispanic and 4 percent multiracial/other<sup>174</sup> (Table 21; Appendix E, Evidence Table 30).

#### Interventions

One of the four studies reported on an educational diet-only intervention.<sup>172</sup> This study evaluated the effect of a calcium-rich diet on weight gain among girls over a 104-week study period. Three of the four home-based studies examined the effect of a combined diet and physical activity intervention on weight outcomes. One of these three studies compared the effect on change in weight at 52 weeks of two educational diet and physical activity interventions, each addressing a different dietary behavior (increased fruit and vegetable intake vs. decreased intake of high fat/high sugar foods).<sup>171</sup> The second study<sup>173</sup> evaluated the effect of a 52-week combined diet and physical activity intervention on television viewing, snack/sweet intake, eating out, and physical activity among entire households. A third study<sup>174</sup> assessed the effect of a combined intervention on dietary fat, fruit and vegetable intake, television viewing, and physical activity. (Table 22; Appendix E, Evidence Table 31).

**Table 21. Study and participant characteristics of studies based in the home**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other	Total N	Followup in Weeks	% Girls <sup>†</sup>	Mean Age [Range] Years <sup>†</sup>	Grade <sup>†</sup>	Race <sup>†</sup>
<i>Home</i>													
Epstein, 2001 <sup>171</sup>	Y	Y	U.S.	NR	6-11	NR		26	52	65	8.6-8.8	NR	NR
Fitzgibbon, 2012 <sup>174</sup>	Y	Y	U.S.	NR	3-5	Pre- school		146	52	50	4.5	Pre- school	BNH 2 Latino 94 Other 4
French, 2011 <sup>173</sup>	Y	Y	U.S.	NR	>5	NR		90 househ olds	52	NR	5-17	NR	NR
Lappe, 2004 <sup>172</sup>	Y	N	U.S.	Girls	9	NR		59	104	100	9.5	NR	NR
<i>Home/PC/CHI</i>													
Patrick, 2006 <sup>175</sup>	Y	N	U.S.	NR	11-15	NR		878	52	49.9	12.7	NR	WNH: 58.4 BNH: 6.6 Hispanic 13.1 API: 3.2 AIAN: 0.7 other: 18
<i>Home/ School/ Community</i>													
Gentile, 2009 <sup>176</sup>	Y	Y	U.S.	NR	NR	3-5		1323	61	53	9.6	3-5	WNH: 90%

AIAN = American Indian/Alaska Native; API = Asian Pacific Islander; BMI = body mass index (in kg/m<sup>2</sup>); BNH = Black non-Hispanic; BP = blood pressure; CHI = consumer health informatics; CVD = cardiovascular disease; Maint = maintenance; meds = medications; N = no; NR = not reported; PC = physical activity; PC = primary care;

RCT = randomized controlled trials; WNH = White non-Hispanic; Y = yes

\*Inclusion/exclusion criteria.

<sup>†</sup>Participant characteristics.

**Table 22. Interventions of studies based in the home**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
<b>Home</b>						
Epstein, 2001 <sup>171</sup>	NA	Take home child workbook; active parental involvement (parent-focused intervention) to increase fruit and vegetable intake.		X		X
		Take home child workbook; active parental involvement (parent-focused intervention) to decrease fat and sugar intake.		X		X
Fitzgibbon, 2012 <sup>174</sup>	Usual care	Nutrition instruction, combined with the physical activity component, was designed to target specific child behaviors. Creating a home environment to facilitate healthy choices. Interactive instruction on family exercise (and healthful eating) . Classroom sessions included an aerobic activity component.	X	X	X	X
French, 2011 <sup>173</sup>	Usual care	Education sessions to - limit consumption of high calorie, limit sweetened drinks, eat at least 5 servings fruits and vegetables each day, eat smaller portions ("eat less"), limit eating fast foods, make healthy choices when eating out Provided guidelines on healthy choices Sessions to encourage 30 minutes of activity per day.	X	X	X	X
Lappe, 2004 <sup>172</sup>	Usual care	Eating calcium rich and fortified foods, no supplements		X		
<b>Home/PC/CHI</b>						
Patrick, 2006 <sup>175</sup>	Usual care	Computer-based counseling and brief provider counseling with a16-section printed Teen Guide, mail, and telephone counseling to modify total intake of fat, servings per day of fruits and vegetables, physical activity, and sedentary behaviors.		X		X
<b>Home/ School/ Community</b>						
Gentile, 2009 <sup>176</sup>	Usual care	The Switch program promoted healthy active lifestyles by encouraging students to 'Switch what you Do (exercise), Chew (eat), and View (sedentary activity)'.		X		X

CHI = consumer health informatics; PC = primary care; Psych = psychosocial intervention; Phys/Env = physical/environmental intervention

## **Outcomes**

### **Diet Interventions**

One out of the four home-based studies was a diet intervention that enrolled 63 girls and randomized 59 to the intervention and control groups.<sup>172</sup>

### **Weight-Related Outcomes**

#### **BMI**

There was no reported difference in BMI at 104 weeks between the intervention and control arms (Appendix E, Evidence Table 32a).<sup>172</sup>

#### **Percent Body Fat**

There was no reported difference in fat mass at 104 weeks between the intervention and control arms (Appendix E, Evidence Table 32a).<sup>172</sup>

#### **Weight**

There was no reported difference in weight at 104 weeks between the intervention and control arms (Appendix E, Evidence Table 32a).<sup>172</sup>

### **Clinical Outcomes**

None reported.

### **Adverse Events**

None reported.

### **Intermediate Outcomes**

#### **Physical Activity and Sedentary Behaviors**

There was no difference in self-reported hours of physical activity between the intervention and control arms (Appendix E, Evidence Table 32b).<sup>172</sup>

#### **Dietary Intake**

At 104 weeks the intervention group had a higher total energy intake compared to the control group. The study did not statistically analyze this between group difference (Appendix E, Evidence Table 32b).<sup>172</sup>

### **Interpretation**

We can make no conclusions on the effectiveness of a home-based diet intervention on obesity or overweight prevention. This is based on the results from a single diet intervention study. This study evaluated the effect of the intervention on BMI percent body fat and weight and found no significant between-group difference with respect to these outcomes. This study also reported on change in physical activity and energy intake and found no significant between-group difference with respect to these outcomes. The study did not specifically target weight gain prevention but rather the effects of a high-calcium diet on weight over a 104-week period. The intervention did not include other dietary modifications or physical activity components. All of the above mentioned factors may have contributed to the attenuated effect of the intervention

on weight and intermediate outcomes. Additionally, a larger sample size may be necessary to further evaluate the impact of the intervention.

## **Physical Activity Intervention**

None reported.

## **Diet and Physical Activity Intervention**

Three of the four home-based studies evaluated the effects of combined diet and physical activity intervention on weight outcomes.<sup>171,173,174</sup> One study enrolled 30 families and randomized 26 children into two intervention groups.<sup>171</sup> Another study randomized 90 participating households with children aged 5-17 to intervention or control group for 52 weeks.<sup>173</sup> A third study consisted of 146 children randomly assigned to receive the intervention or control.<sup>174</sup>

## **Weight-Related Outcomes**

### **BMI z-Score**

Two home-based studies assessed the effect of a combined diet and physical activity intervention on BMI z-score. In both studies there was no significant intervention effect on BMI z-score at 52 weeks followup ( $p>0.05$ ) (Appendix E, Evidence Table 33a).<sup>173,174</sup>

### **BMI**

In one of these three studies, there was no significant between- group difference at the post-intervention or 1-year followup visit ( $p>0.05$ ).<sup>174</sup> (Appendix E, Evidence Table 33a).<sup>174</sup>

### **Prevalence of Overweight and Obesity**

At 52 weeks, one study demonstrated a decrease in the percent of overweight children in the increased fruit and vegetable group of 1.10 percent (S.D. 5.29), and a 2.40 (S.D. 5.39) percent decrease in percent of overweight children in the decreased high fat/high sugar intervention group. This difference was not statistically different ( $p>0.05$ ).<sup>171</sup> A second study reported that the prevalence of obesity among all participants decreased from 21 to 15 percent at 52 weeks. The study did not report or statistically analyze this change by intervention or control group. (Appendix E, Evidence Table 33a).

### **Weight**

In one study there was no significant intervention effect on weight post-intervention or at the 52-week followup period ( $p\text{ value}>0.05$ ) (Appendix E, Evidence Table 33a).<sup>171</sup>

## **Clinical Outcomes**

None reported.

## **Adverse Events**

None reported.



## Intermediate Outcomes

### Physical Activity and Sedentary Behavior

In two studies there was no significant difference between the intervention and control group in minutes per day of physical activity (Appendix E, Evidence Table 33b).<sup>173,174</sup>

In two studies there was no significant difference between the intervention and control group in TV viewing or general screen time (Appendix E, Evidence Table 33b).<sup>173,174</sup>

### Dietary Intake

All three studies<sup>171,173,174</sup> demonstrated a favorable intervention effect on fruit and vegetable intake but only one study<sup>173</sup> demonstrated a statistically significant intervention effect on fruit and vegetable intake among adolescents only ( $p=0.05$ ) (Appendix E, Evidence Table 33b).<sup>173</sup>

In one study there was no difference in sugar-sweetened beverage intake between the intervention and control group ( $p=0.96$ ) (Appendix E, Evidence Table 33b).<sup>173</sup>

In another study there was no difference between the intervention and control in energy intake (Appendix E, Evidence Table 33b).<sup>174</sup>

### Interpretation

The strength of the evidence is low that combined diet and physical activity interventions in a home setting effectively prevent obesity or overweight. Combined interventions in this setting had a beneficial effect on fruit and vegetable intake. However, no conclusions can be made regarding their effect on other dietary, physical activity, or sedentary behaviors. These conclusions are supported by results of three studies reporting on the effect of combined diet and physical activity interventions in the home setting.<sup>171,173,174</sup>

One study reported on BMI and did not demonstrate a favorable or significant intervention effect with respect to this outcome measure.<sup>174</sup> Another study reported on BMI z-score and did not demonstrate a statistically significant or favorable intervention effect.<sup>173</sup> A third study reported on prevalence of overweight and demonstrated a change in favor of one intervention group.<sup>171</sup> This change in prevalence of overweight was not statistically significant.<sup>171</sup>

Two studies reported on physical activity and sedentary behavior.<sup>173,174</sup> Both studies demonstrated a favorable but nonsignificant intervention effect on physical activity.<sup>173,174</sup> Neither study demonstrated a favorable or significant intervention effect on screen time.<sup>173,174</sup>

Three studies demonstrated a favorable intervention effect on fruit and vegetable intake;<sup>171,173,174</sup> one of these was significant<sup>173</sup> and two were not significant.<sup>171,173</sup> One study reported on sugar-sweetened beverages and did not demonstrate a favorable or significant intervention effect.<sup>173</sup> One study reported on energy intake and did not demonstrate a favorable or significant intervention effect.<sup>174</sup>

Use of interventions with significant parental/family involvement may have contributed to beneficial intervention effects studies demonstrated on select intermediate outcomes. However, additional studies with larger sample sizes, greater intervention intensity and longer followup may be necessary to further evaluate the impact of combined home based interventions on the prevention of obesity in children.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

No conclusion can be made about the effectiveness of a home-based diet intervention on obesity prevention. We based this on a single study with moderate risk of bias and no measurable impact of the intervention. The strength of evidence is low that combined diet and physical activity interventions in a home setting positively impact obesity prevention. We graded the strength of evidence low because it included three moderate to high risk of bias studies, that were inconsistent (one demonstrated a positive effect, two demonstrated a negative effect) and imprecise (Table 23, Appendix F, Strength of Evidence Table 1).

### **Intermediate Outcomes**

No conclusion can be made about the effectiveness of combined diet and physical activity interventions in a home setting on physical activity, screen time, sugar-sweetened beverage intake or energy intake. We graded this body of evidence as insufficient because it included inconsistent studies with moderate to high risk of bias and imprecise results. The strength of the evidence is low that combined diet and physical activity interventions in a home setting positively impact fruit and vegetable intake. This is due to the moderate risk of bias, consistent effect in favor of the intervention, and lack of precision (Appendix F, Strength of Evidence Tables 2, 4-7).

**Table 23. Summary of the strength of evidence for weight-related outcomes in studies taking place in a home setting**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Mode Rate/High Risk of Bias(n)	% With Favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Home	D, 1	2004	59	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Insufficient
	C, 3	2001-2012	262	0/2/1	0	33	Moderate	Inconsistent	Imprecise	Direct	Low

D = diet intervention; PA = physical activity intervention; C = combination of diet and physical activity interventions

## **Home-Primary Care-Consumer Health Informatics–Based Studies**

### **Study Characteristics**

We included one RCT conducted in the U.S.<sup>175</sup>. The study's stated goal was to improve diet, physical activity and sedentary behaviors.<sup>175</sup> The study included participants aged 11 to 15 years, and participants who did not have health conditions which could have limited their ability to comply with physical activity or diet recommendations (Table 21; Appendix E, Evidence Table 34).<sup>175</sup>

### **Population Characteristics**

The study included a total of 878 participants.<sup>175</sup> The total followup period was 52 weeks. Forty nine percent were girls and the mean age of all participants was 12.7 years (+/- 1.3 years.) The study did not report the grade level of the participants.<sup>175</sup> In this study<sup>175</sup> 58.4 percent of participants were white, 6.6 percent African-American, 13.1 percent Hispanic, 3.2 percent Asian or Pacific Islander, 0.7 percent Native American, and 18 percent multi-ethnic or other (Table 21; Appendix E, Evidence Table 35).

### **Interventions**

This study reported on a 52-week educational diet and physical activity intervention.<sup>175</sup> The study evaluated how a multi-strategy intervention (computer-supported assessment followed by provider counseling [monthly mail and telephone counseling]) affected eating and physical activity behaviors (Table 22; Appendix E, Evidence Table 36).

### **Outcomes**

#### **Diet Interventions**

None reported.

#### **Physical Activity Interventions**

None reported.

#### **Diet and Physical Activity Interventions**

One study evaluated the effects of a combined diet and physical activity intervention relative to a control group on BMI z-score at 52 weeks.<sup>175</sup> The study randomized 878 participants and included 819 in the analysis.

### **Weight-Related Outcomes**

#### **BMI z-Score**

The study reported no significant difference in overall BMI z score at 52 weeks between the intervention and control arms ( $p \geq 0.05$ ) (Appendix E, Evidence Table 37a).<sup>175</sup> Among participants with a BMI greater than or equal to the 95<sup>th</sup> percentile, mean BMI z-score was 0.04 less in the intervention group compared to the control group at 52 weeks, which was not statistically significantly different ( $p=0.10$ )<sup>175</sup> (Appendix E, Evidence Table 37a,b).

## **Clinical Outcomes**

None reported.

## **Adverse Events**

None reported

## **Intermediate Outcomes**

### **Physical Activity and Sedentary Activity**

The study reported no significant difference in minutes per week of moderate plus vigorous physical activity between the intervention and control group among girls ( $p=0.90$ ) or boys ( $p=0.017$ )(Appendix E, Evidence Table 37c).<sup>175</sup>

The number of hours per day of sedentary behaviors decreased significantly in the intervention group compared to the control at 52 weeks among girls and boys ( $p=0.001$ ) (Appendix E, Evidence Table 37c).<sup>175</sup>

### **Dietary Intake**

The study reported no significant difference in percent calories from fat among girls ( $p=0.86$ ) or boys ( $p=0.31$ ), nor in fruit and vegetable consumption between the intervention and control groups among girls ( $p=0.07$ ) or boys ( $p=0.49$ ) (Appendix E, Evidence Table 37c).

## **Interpretation**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a home setting with primary care and consumer health informatics components on obesity or overweight. No conclusions can be made regarding the effectiveness of a combined diet and physical activity intervention in a home setting with primary care and consumer health informatics components on diet and physical activity. Combined diet and physical activity interventions in this setting have a favorable and significant effect on sedentary behaviors. We based this on results of a single study reporting on a combined diet and physical activity intervention.<sup>175</sup>

This study evaluated the effect of an intervention on BMI z-score.<sup>175</sup> and reported a favorable but nonstatistically significant intervention effect on BMI z-score among obese adolescents<sup>175</sup> and a nonsignificant intervention effect on BMI z-score for the overall sample.<sup>175</sup> We were unable to determine if there was a favorable effect of the intervention because the study did not provide BMI z-score values for the overall sample. This study demonstrated a favorable and statistically significant intervention effect on sedentary behaviors and demonstrated a favorable but nonsignificant intervention effect on physical activity among boys<sup>175</sup> and a favorable but nonsignificant intervention effect on fruit and vegetable intake among girls.<sup>175</sup>

The integrated approach, including family engagement, computer-based behavioral assessments, and provider and telephone counseling, may have contributed to observed beneficial effects on select intermediate outcomes. However, additional studies with longer followup and greater intervention intensity may be needed to appreciate subsequent changes in weight-related outcomes.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

We make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a home setting with primary care and consumer health informatics components on obesity or overweight. This is due to the inclusion of a single study that lacked precision with regard to the results from the overall sample. We were unable to determine the magnitude of the intervention effect on BMI z-score for the entire sample because the study did not provide actual outcome values (Table 24; Appendix F, Strength of Evidence Table 1).

### **Intermediate Outcomes**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a home setting with primary care and consumer health informatics components on diet or physical activity. This was due to the inclusion of a single study that lacked precision and demonstrated favorable effect for sex-based subgroups only. The strength of evidence is low that a combined diet and physical activity intervention in a home setting with primary care and consumer health informatics components positively impacts sedentary behaviors. This is due to the low risk of bias, favorable effect on the outcome for the overall sample and high precision (Appendix F, Strength of Evidence Tables, 2,4,6, and 7 ).

**Table 24. Summary of the strength of evidence for weight-related outcomes in studies taking place in a home setting with primary care and consumer health informatics components**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Home-PC-CHI	C, 1	2006	878	1/0/0	0	Unable to determine – actual outcome values not reported only significance	Low	NA	Imprecise	Direct	Insufficient

C = combination diet and physical activity intervention; PC = primary care; CHI = consumer health informatics; NA = not applicable

## **Home-School-Community–Based Studies**

### **Study Characteristics**

We included one RCT conducted in the U.S.<sup>176</sup> The stated goal of the intervention was to prevent obesity. Participants included students attending grade 3 through 5 of two community school districts (Table 21; Appendix E, Evidence Table 38).

### **Population Characteristics**

The study included a total of 1,323 participants. The total followup period (including an additional measurement period at 6 months post-intervention) was 61 weeks. Roughly half (53 percent) of the participants were girls. The mean age of the participants was 9.6 (+/- 0.9 years). All of participants were in grades 3 through 5 and 90 percent of participants were white (Table 21; Appendix E, Evidence Table 39).

### **Interventions**

This study reported on an educational diet and physical activity intervention. It evaluated the effects of the intervention on three targeted behaviors (increase fruit and vegetable intake, increase physical activity, and decreased screen time) over a 61-week study period (Table 22; Appendix E, Evidence Table 40).

### **Outcomes**

#### **Diet Intervention**

None reported.

#### **Physical Activity Intervention**

None reported.

### **Diet and Physical Activity Intervention Studies**

One study evaluated the effects of a combined diet and physical activity intervention relative to a control group on BMI at 34 and 61 weeks.<sup>176</sup> The study randomized 1,323 participants and included 992 in the analysis at all three data collection points (baseline, post intervention, and 6 months post intervention).

### **Weight-Related Outcomes**

#### **BMI**

At 34 weeks, mean BMI was 19 kg/m<sup>2</sup> (S.E. 0.03) for the control group, and 19 kg/m<sup>2</sup> (S.E. 0.02) for the intervention group. The difference in mean BMI between the groups did not reach statistical significance ( $p \geq 0.06$ ) (Evidence Table 41a). At 61 weeks, the mean BMI was 19.5 kg/m<sup>2</sup> (S.E. 0.1) for the control group and 19.4 kg/m<sup>2</sup> (S.E. 0.1) for the intervention group. The difference in mean BMI between the groups did not reach statistical significance ( $p \geq 0.05$ ) (Appendix E, Evidence Table 41a).

There was a significant effect difference in boys at 61 weeks ( $p < 0.05$ ), with boys in the intervention group demonstrating a 0.3 kg/m<sup>2</sup> lower BMI than boys in the control group (Evidence Table 41b).



## **Clinical Outcomes**

None reported.

## **Adverse Events**

None reported.

## **Intermediate Outcomes**

### **Physical Activity and Sedentary Activity**

There was no statistically significant difference in physical activity (steps/day) or screen time between the intervention and control group at either followup time period (Appendix E, Evidence Table 41c).

### **Dietary Intake**

Children in the intervention group reported significantly more fruit and vegetable consumption compared to the control group at 61 weeks ( $p < 0.05$ ). (Appendix E, Evidence Table 41c).

## **Interpretation**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a home setting with school and community components on obesity or overweight. We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a home setting with school and community components on diet, physical activity, or sedentary behaviors. This is due to the results of a single study reporting on a combined diet and physical activity intervention.<sup>176</sup>

This study evaluated the effect of the intervention on BMI and found no favorable or statistically significant effect for the overall sample. However, it demonstrated a significant intervention effect among boys at 61 weeks.<sup>176</sup> This study also reported on the effect of the intervention on child-reported physical activity, screen time, and fruit and vegetable intake and demonstrated a favorable effect with respect to these outcome measures at 61 weeks. However, only fruit and vegetable intake was significantly different between the intervention and control groups at 61 weeks.

A comprehensive approach with family, school, and community components, may have contributed to observed beneficial effects on behavior change. However, additional studies of greater quality with longer intervention duration and followup may be needed to appreciate subsequent changes in weight-related outcomes.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a home setting with school and community components on obesity or overweight. This is due to the inclusion of a single study with high risk of bias, and poor precision with respect to BMI for the overall sample (Table 25; Appendix F, Strength of Evidence Table 1).

## **Intermediate Outcomes**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a home setting with school and community components on diet, physical activity or sedentary behaviors. This is due to the inclusion of a single study with high risk of bias (Appendix F, Strength of Evidence Tables 4, 6, and 7).

**Table 25. Summary of the strength of evidence for weight-related outcomes in studies taking place in a home setting with school and community components**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable Outcome (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Home-School-Community	C, 1	2009	1323	0/0/1	0	0	High	NA	Imprecise	Direct	Insufficient

C = combination diet and physical activity intervention; NA = not applicable

Key Question 3: What is the comparative effectiveness of primary care-based interventions for the prevention of obesity or overweight in children?

## **Key Points**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a primary care setting on obesity or overweight prevention.

## **Primary Care–Based Studies**

### **Study Characteristics**

We included one study from the U.S. that used a quasi-experimental design.<sup>177</sup> The goal of the intervention was to prevent obesity. The study included participants aged 5 to 18 years (Table 26; Appendix E, Evidence Table 42).

### **Population Characteristics**

The study included 600 subjects<sup>177</sup>. The followup period was 78 weeks,<sup>177</sup> 47 percent of participants were girls, 56 percent were 5-11 years, and 44 percent were 12-17 years. This study did not report race or grade level (Table 26; Appendix E, Evidence Table 43).<sup>178</sup>

### **Interventions**

One study<sup>177</sup> reported on a combined diet and physical activity intervention and used educational and physical environmental approaches including improving clinical decision support, counseling families and patients on “5-2-1-0” behavioral goals (consuming at least five or more servings of fruits and vegetables daily, limiting screen time to no more than 2 hours daily, engaging in at least 1 hour or more of daily physical activity, and avoiding sugar-sweetened beverages), and providing overall practice and provider management over the entire 78-week study period (Table 27; Appendix E, Evidence Table 44).

**Table 26. Summary table for study and participant characteristics in primary-care based settings**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls†	Mean Age [Range] Years†	Grade†	Race†
Polacsek, 2009 <sup>177</sup>	N	Y	U.S.	NR	5-18 years	NR	NR	600	78	47	5-17 years	NR	NR

N = no; NR = not reported; RCT = randomized controlled trials; Y = yes

\*Inclusion/exclusion criteria.

†Participant characteristics.

**Table 27. Summary table for intervention in primary care-based settings**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Polacsek, 2009 <sup>177</sup>	NA	Encouraging >5 servings of fruits and vegetables daily; limiting screen time to <2 hours daily and; avoiding (0) sugar-sweetened beverages and greater than 1 hour of physical activity daily. Pediatric Obesity Clinical Decision Support Chart with an algorithm and guidelines for the prevention and management of overweight.	X	X	X	X

Psych = psychosocial intervention; Phys/Env = physical/environmental intervention; NA = not applicable

## **Outcomes**

### **Diet Interventions**

None reported

### **Physical Activity Interventions**

None reported.

### **Diet and Physical Activity Interventions**

One non-RCT study included 600 participants in the analysis.<sup>177</sup>

### **Prevalence of Overweight and Obesity**

The prevalence of overweight in the intervention group increased from 36.8 to 38.9 percent during the study. The study did not statistically analyze this change (Appendix E, Evidence Table 45a).<sup>177</sup> The prevalence of obesity in the intervention group increased from 19.8 to 20.3 percent during the study. The study did not statistically analyze this change (Appendix E, Evidence Table 45a).<sup>177</sup>

### **Clinical Outcomes**

None reported.

### **Adverse Events**

None reported.

## **Intermediate Outcomes**

### **Physical Activity and Sedentary Activity**

Fifteen percent of parents reported making physical activity changes for themselves and their children (Appendix E, Evidence Table 45b).<sup>177</sup> The study did not measure parent-reported behavioral changes at baseline.

Twelve percent of parents reported making TV/screen changes for themselves and their children (Appendix E, Evidence Table 45b).<sup>177</sup> The study did not measure parent-reported behavioral changes at baseline.

### **Dietary Intake**

In the study, 26 percent of parents reported making nutrition changes and 17 percent of parents reported making changes in sugar-sweetened beverages consumption for themselves and their children (Appendix E, Evidence Table 45b).<sup>177</sup> The study did not measure parent-reported behavioral changes at baseline.

## **Interpretation**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a primary care setting on obesity or overweight. We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a primary care setting on diet, physical activity or sedentary behaviors. This is due to the results of a single arm study reporting on a combined diet and physical activity intervention.<sup>177</sup> This study

evaluated the effect of an intervention on prevalence of overweight and obesity, both of which increased during the intervention. The study did not statistically analyze this change in prevalence of overweight and obesity. The study reported on percent of parents reporting diet, physical activity and screen time changes, based on surveys conducted during the intervention. However, it did not report any baseline values for these outcomes, hence we could not fully assess the intervention effect. Although the study's overall goal was to reduce the risk of childhood obesity, the intervention primarily aimed to achieve this goal through direct improvement of clinical decision support and family management of risk behaviors. Hence the intervention effect on weight outcomes may have been attenuated. Additional factors that may have limited intervention effectiveness include the lack of randomization, absent comparison group, and failure to reassess weight outcomes following the completion of the intervention. Parental reports of behavior changes did not appear to impact their children's outcomes.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a primary care setting on obesity or overweight prevention. This is due to the inclusion of a single imprecise study with a moderate risk of bias (Table 28, Appendix F, Strength of Evidence Table 1).

### **Intermediate Outcomes**

We can make no conclusions regarding the effectiveness of a combined diet and physical activity intervention in a primary care setting on diet, physical activity or sedentary behaviors. This is due to the inclusion of a single imprecise study with a moderate risk of bias and no testable intervention effect (Appendix F, Strength of Evidence Tables 6 and 7).

**Table 28. Summary of the strength of evidence for weight-related outcomes in studies taking place in a primary care setting**

<b>Setting</b>	<b>Intervention, n</b>	<b>Years of Publication</b>	<b>Enrolled Participants</b>	<b>Studies With Low/Moderate/High Risk of Bias(n)</b>	<b>% With Favorable Outcome (Statistically Sig) Outcome</b>	<b>% With Favorable Outcome (Does Not Need to be Stat Sig)</b>	<b>Risk of Bias</b>	<b>Consistency</b>	<b>Precision</b>	<b>Directness</b>	<b>Strength of the Evidence</b>
Primary Care	C, 1	2009	600	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Insufficient

C = combination diet and physical activity intervention; NA = not applicable



## Key Question 4: What is the comparative effectiveness of child-care-based interventions for the prevention of obesity or overweight in children?

### Key Points

One non-RCT study tested an educational physical activity intervention and found significant differences in weight outcomes between the intervention and control groups. The strength of evidence is insufficient that diet alone or physical activity alone prevent obesity or overweight in child-care setting.

Two out of three studies showed no statistical difference in weight outcomes between the intervention and control groups. Combined diet and physical activity interventions implemented in child-care setting showed no beneficial effect at preventing obesity, with a low strength of evidence.

### Childcare–Based Studies

#### Study Characteristics

Five articles reported on four studies.<sup>77,102,179,180</sup> Two articles<sup>77,181</sup> reported on one study and count as one study. Three were RCTs<sup>77,179,180</sup> and one was a non-randomized<sup>102</sup> prospective study. Two<sup>77,180</sup> out of the four studies conducted in child-care settings stated the goal of the study was obesity prevention and weight maintenance in children. Only one study<sup>180</sup> took place in the U.S., while two<sup>102,179</sup> took place in Germany and one in Switzerland<sup>77</sup> (Table 29; Appendix E, Evidence Table 46).

#### Population Characteristics

The number of participants in four included studies was 2,657. The followup period for one was 52 weeks,<sup>77</sup> for another was 78 weeks<sup>179</sup> and for two others was 104 weeks.<sup>102,180</sup> Across all studies 47.6 to 50 percent of the participants were girls. The age range of the participants in all four studies was 3 to 6.1 years. Two out of the four studies reported the grade level and participants in both studies were preschoolers.<sup>77,102</sup> Only one study described race and the race distribution was as follows: 81.4 percent Hispanic, 11.5 percent Black, and 7.5 percent others/multiracial<sup>180</sup> (Table 29; Appendix E, Evidence Table 47).

#### Interventions

One study reported on a physical activity intervention comprising of a playful-athletic exercise program lasting 1 hour, 3 times a week.<sup>102</sup> The exercises were easy to do and included running with a newspaper in front of the breast without letting the paper fall down, jumping from a chalk circle into another and balancing on a line. This non-RCT evaluated the effect of 104 weeks of physical activity training on BMI, percent body fat, and skinfold thickness in pre-school children in 17 nursery schools in Berlin.

Three studies<sup>77,179,180</sup> evaluated the effect of combined diet and physical activity interventions. One of them included an educational component and alterations in food served and physical activity recommended during an aftercare program for kindergarteners.<sup>179</sup> It aimed to achieve this through educating care providers and communication with families. The study analyzed two samples, control and intervention, containing different children, at time intervals of 5.7 and 17.6 months after the start of the intervention.<sup>179</sup>

Another study randomized 12 Latino Head Start centers to a culturally tailored combined diet and physical activity intervention or control group.<sup>180</sup> The intervention consisted of a variety of diet and physical activity modification curriculum delivered by trained early childhood educators for 14 weeks. This included 20 minutes of nutritional activity based on hand puppets reflecting the food pyramid and 20 minutes of aerobic activity. Behaviors for the intervention included increased fruit and vegetable consumption, decreased fat intake, decreased sedentary behaviors, and increased physical activity.

The third study had a multidimensional culturally tailored intervention which included a physical activity program, lessons on nutrition, media use, and sleep for pre-school children in a high migrant population.<sup>77</sup> (Table 30; Appendix E, Evidence Table 48).

**Table 29. Study and participant characteristics of studies based in childcare settings**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls <sup>†</sup>	Mean Age [Range] Years <sup>†</sup>	Grade <sup>†</sup>	Race <sup>†</sup>
Bayer, 2009 <sup>179</sup>	Y	N	Germany	NR	NR	NR	NR	1,340	78	47.6	6.12	Kindergarten	NR
Fitzgibbon, 2006 <sup>180</sup>	Y	Y	U.S.	NR	NR	NR	NR	401	104	49.4	4.3	Pre-school	Latino 81.4% Black 11.5% Other 7.5%
Metcalf, 2012 <sup>77</sup> Burgi, 2012 <sup>181</sup>	Y	Y	Switzerland	NR	NR	Pre School	NR	652	52	50	5.2	Pre-school	NR
Scheffler, 2007 <sup>102</sup>	N	N	Germany	NR	NR	Pre School	NR	264	104	NR	NR	NR	NR

N = no; NR = not reported; RCT = randomized controlled trials; Y = yes

\*Inclusion/exclusion criteria.

<sup>†</sup>Participant characteristics.

**Table 30. Interventions of studies based in child-care settings**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
Bayer, 2009 <sup>179</sup>	Usual care	Tiger Kids “low cost behavioral intervention.” An Internet platform with supporting information for Kindergarten teachers and families: modifying habits of food and drink consumption, and regular consumption of water and other nonsugared drinks. Offer fruits and vegetables throughout the day. Information materials and modules with songs for use in the day care Enhancing physical activity.	X	X	X	X
Fitzgibbon, 2006 <sup>180</sup>	Usual care	Nutrition activity based on hand puppets that reflected the food pyramid. Curriculum to increase physical activity and aerobic activity.	X		X	
Metcalf, 2012 <sup>77</sup> Burgi, 2012 <sup>181</sup>	Usual care	Information sessions for children focusing on healthy nutrition. Information sessions that included promoting physical activity. Extra physical activity sessions, additional exercise equipment was provided.	X	X	X	X
Scheffler, 2007 <sup>102</sup>	Usual care	Playful athletic exercise programs were designed. The exercises targeted improving the pleasure of movement and train the motor basics like endurance, power, speed and skillfulness.				X

Psych = psychosocial intervention; Phys/Env = physical/environmental intervention

## **Outcomes**

### **Diet Interventions**

No study reported.

### **Physical Activity Interventions**

One study out of the four child-care center-based studies was a physical activity intervention that enrolled 264 children from 17 nursery schools and followed them for 104 weeks.<sup>102</sup>

### **Weight-Related Outcomes**

#### **BMI**

The study reported an increase in the BMI of intervention children compared with children of the control group in both sexes (16.56 kg/m<sup>2</sup> vs. 16.41 kg/m<sup>2</sup> in boys and 16.10 kg/m<sup>2</sup> vs. 15.86 kg/m<sup>2</sup> in girls, no p value reported).<sup>102</sup> However with the additional analysis of body composition (e.g., skeleton, body fat) the data indicates that the comparative high BMI in the physical activity intervention group is a result of higher percentage of muscle and not body fat<sup>102</sup> (Appendix E, Evidence Table 49a).

#### **Percent Body Fat**

Similarly this study reported a significant lower percentage of body fat in the intervention group compared to the control group (16.34 vs. 17.26 percent in boys and 19.33 vs. 19.75 percent in girls, no p value reported)<sup>102</sup> (Appendix E, Evidence Table 49a).

#### **Skinfold Thickness**

This study also reported a significant decrease in triceps skinfold thickness in the intervention group compared to the control group (8.05 mm vs. 8.64 mm in boys and 9.10 vs. 9.26 in girls, no p value reported)<sup>102</sup> (Appendix E, Evidence Table 49a).

### **Clinical Outcomes**

The physical activity-only intervention resulted in significant lower diastolic blood pressure at 104 weeks after the start of the intervention (Intervention group 62.0 SD 11.2 mm Hg vs. 68.8 SD 11.1 mm Hg, p<0.001) (Appendix E, Evidence Table 49b).

### **Adverse Events**

None reported.

### **Intermediate Outcomes**

None reported.

### **Interpretation**

The results from an outcome measure from the one study reporting on physical activity interventions in a child-care setting support our conclusions. In this study, there was no significant beneficial physical activity intervention effect on BMI but there were significant positive intervention effect with respect to percent body fat, skinfold thickness, and diastolic

blood pressure in a child-care setting. We need more well-designed studies to further evaluate the impact of the intervention in this setting.

## **Diet and Physical Activity Intervention**

Three RCTs out of the four child-care center-based studies assessed the effects of combined diet and physical activity diet on weight outcomes. One study randomly assigned 64 kindergartens as intervention or control with samples of 1,318 and 1,340 included in analyses<sup>179</sup>. Another study randomized 420 children attending 12 head start centers and followed them for 104 weeks. The third study randomized 652 children in a high migrant population.

## **Weight-Related Outcomes**

### **BMI z-Score**

One study reported on BMI z-score and found no significant difference between the intervention and control group at 52 weeks (0.00 vs. 0.07,  $p=0.56$ ) and 104 weeks (-0.13 vs. 0.00,  $p=0.34$ ) post intervention<sup>180</sup> (Appendix E, Evidence Table 50a,b).

### **BMI**

Two studies reported on BMI and found no significant difference in BMI of intervention group compared with the control group. In one study the mean increase in BMI was 0.33 kg/m<sup>2</sup> versus 0.48 kg/m<sup>2</sup> ( $p=0.46$ ) at 52 weeks and 0.46 kg/m<sup>2</sup> vs. 0.70 kg/m<sup>2</sup> ( $p=0.34$ ) at 104 weeks followup.<sup>180</sup> The second study reported that compared with the control children in the intervention group had no significant difference in BMI (-0.07 kg/m<sup>2</sup>, -0.19 to 0.06,  $p=0.31$ )<sup>77</sup> (Appendix E, Evidence Table 50a,b).

### **Prevalence of Overweight and Obesity**

Two studies reported on the prevalence of overweight and found no difference in the prevalence of overweight.<sup>77,179</sup> One study at 78 weeks followup found no difference between the intervention and the control groups.<sup>179</sup> The odds ratio for overweight was 0.73 (95% CI 0.51-1.04),  $p=0.054$  in the first sample and 0.89 (95% CI 0.66-1.22),  $p=0.59$  in the second sample.<sup>179</sup> Similarly, this study did not report any difference in the prevalence of obesity at 78 weeks between the intervention and the control groups. The odds ratio for obesity was 0.58 (95% CI 0.31-1.10),  $p=0.074$  in the first sample and 0.79 (95% CI 0.35-1.77),  $p=0.63$  in the second sample.<sup>179</sup> The second study found no difference between intervention (10.5 to 11.0 percent) and control group (13.0 to 14.9 percent) at 52 weeks post intervention ( $p=0.23$ )<sup>77</sup> (Appendix E, Evidence Table 50a,b).

### **Percent Body Fat**

One study reported significant intervention effect on percent body fat. The percent body fat decreased from a baseline of 23.7 to 23.2 percent, 52 weeks post intervention in the intervention group and increased from 23.6 to 24.1 percent in the control group with a between group difference of -1.1, 95% CI -2.02 to -0.20 ( $p=0.02$ )<sup>77</sup> (Appendix E, Evidence Table 50a,b).

### **Waist Circumference**

The same study reported on and also found significant intervention effect on waist circumference. The waist circumference increased from a baseline of 52.8cm to 53.3cm, 52 weeks post intervention in the intervention group and increased from 52.8cm to 54.3cm in the

control group with a between-group difference of -1.0, 95% CI -1.6 to -0.42 ( $p = 0.001$ )<sup>77</sup> (Appendix E, Evidence Table 50a,b).

### **Clinical Outcomes**

None reported.

### **Adverse Events**

None reported.

### **Intermediate Outcomes**

#### **Physical Activity and Sedentary Activity**

Two combined diet and physical activity intervention studies reported on physical activity and neither found significant intervention effect<sup>77,180</sup> (Appendix E, Evidence Table 50c).

#### **Dietary Intake**

One combined diet and physical activity intervention resulted in higher fruit and vegetable consumption in the two different samples at 78 weeks after the start of the intervention compared to the control group. The odds ratio for high fruit consumption was 1.64 (95% CI 1.26-2.12),  $p < 0.001$  in the first sample and 1.59 (95% CI 1.26-2.01),  $p < 0.001$  in the second sample.<sup>179</sup> Another combined diet and physical activity intervention study found no significant intervention effect on total fat intake or fiber intake<sup>180</sup> (Appendix E, Evidence Table 50c).

### **Interpretation**

The results from an outcome measure from three studies reporting on combined diet and physical activity interventions in a child-care setting support our conclusions. Across all three combined diet and physical activity intervention studies in the child-care center-based settings, there were no significant between-group differences with respect to BMI z-score,<sup>180</sup> BMI,<sup>77</sup> and prevalence of obesity and overweight.<sup>179</sup> One out of the three combined diet and physical activity intervention studies found significant increase in fruit and vegetable intake. However, none of these studies found significant intervention effect on physical activity, total fat intake, or fiber intake. The small sample size and poor quality of these studies may have contributed to the attenuated effect of the intervention on weight outcomes. We need high quality studies with a larger sample size to further evaluate the impact of the intervention.

### **Strength of the Evidence**

#### **Weight-Related Outcomes**

The strength of evidence is insufficient that a physical activity intervention reduces BMI, percent body fat, and skinfold thickness in a child-care center-based (only) setting because only one study with high risk of bias and direct and imprecise results evaluated this intervention on the prevention of obesity. There is no evidence of benefit for combined diet and physical activity interventions delivered in a child-care setting for prevention of child overweight and obesity. The strength of evidence is low because studies that addressed these outcomes had moderate risk of bias with direct, consistent, and imprecise results (Table 31, Appendix F, Strength of Evidence Table 1).

## **Intermediate Outcomes**

There is no evidence of benefit for combined diet and physical activity intervention based in a child-care setting on increasing physical activity among children. The confidence in this conclusion is low because studies evaluating these outcomes had moderate risk of bias with direct and consistent results. We could not make a conclusion about the effectiveness of combined diet and physical activity interventions on increasing dietary intake of fruits and vegetables, total fat intake or fiber intake in a child-care setting. The strength of evidence is insufficient that a combined diet and physical activity intervention increases the intake of fruits and vegetables, total fat intake, or fiber intake in a child-care center-based (only) setting because only one study with moderate risk of bias and precise result addressed these outcomes (Appendix F, Strength of Evidence Tables 2-4).



**Table 31. Summary of the strength of evidence for weight-related outcomes in studies taking place in childcare**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Childcare	P, 1	2007	268	0/0/1	100	100	High	NA	Precise	Direct	Insufficient
	C, 3	2009-2012	2393	1/2/0	33	33	Moderate	Inconsistent	Imprecise	Direct	Low

P = physical activity interventions; C = combination diet and physical activity interventions; NA = not applicable

Key Question 5: What is the comparative effectiveness of community-based or environment-level interventions for the prevention of obesity or overweight in children?

## **Key Points**

### **Community and Community Plus–Based Studies**

The strength of evidence is insufficient that a physical activity-only intervention is more effective at preventing obesity or overweight than the control based on one RCT study. We found positive but nonsignificant changes in percent body fat in this intervention.

The strength of evidence is moderate that a diet and physical activity intervention combined with other approaches is more effective at preventing obesity or overweight than the control based on six RCTs and two non-RCTs. We found desirable changes in BMI or BMI z-score in five of the nine studies.

### **Community-Only–Based Studies**

#### **Study Characteristics**

One RCT took place in Switzerland. The stated goal of this study was not weight maintenance. This study included only boys participating in sports (Table 32; Appendix E, Evidence Table 51).<sup>182</sup>

#### **Population Characteristics**

The study included 46 participants and followed them for 52 weeks. All participants were middle school-aged. It did not report race (Table 32; Appendix E, Evidence Table 52).<sup>182</sup>

#### **Interventions**

The study included a combined diet and physical activity intervention (Table 33; Appendix E, Evidence Table 53).

**Table 32. Study and participant characteristics of studies based in the community**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls <sup>†</sup>	Mean Age [Range] Years <sup>†</sup>	Grade <sup>†</sup>	Race <sup>†</sup>
<b>Community Only</b>													
Eiholzer, 2010 <sup>182</sup>	Y	N	Switzerland	Boys	NR	NR	NR	46	52	0	13.3	NR	NR
Com-munity/ School													
Sallis, 2003 <sup>75</sup>	Y	Y	U.S.	NR	NR	NR	NR	24 schools (mean enrollment 1,109)	104	49	NR	NR	WNH: 39.5
Singh, 2009 <sup>183</sup>	Y	Y	Nether-lands	NR	NR	NR	NR	1,108	32-80	53.3	12.7	NR	NR
Chomitz, 2010 <sup>184</sup>	N	Y	U.S.	NR	>5	NR	NR	1,858	156	48.2	7.7	NR	WNH : 37.1 BNH: 37.3 Latino/Hispanic: 14.0 API: 10.2 Other: 1.7
<b>Community/ School/ Home</b>													
Economos, 2007 <sup>185</sup>	N	Y	U.S.	NR	NR	NR	NR	1,178	43	NR	7.34 – 7.9	1st grade 32.2% - :47.4% 2nd grade 23.7% - 29.6% 3rd grade 28.9%- 38.2%	WNH:37.8 – 51.7 BNH : 6.9 – 25.1 Latino/ Hispanic: 11.8 – 22.8 API : 2.3 – 9.1 Other: 11-23

**Table 32. Study and participant characteristics of studies based in the community (continued)**

Author, Year	RCT	Goal: Obesity Prevention	Country	Sex*	Age Range, Years*	Grade*	Other*	Total N	Followup in Weeks	% Girls <sup>†</sup>	Mean Age [Range] Years <sup>†</sup>	Grade <sup>†</sup>	Race <sup>†</sup>
<b>Community/ Home</b>													
Robinson, 2010 <sup>186</sup>	Y	Y	U.S.	Girls	8-10	NR	NR	261	104	100	9.4	NR	BNH: 100%
Klesges, 2012 <sup>187</sup>	Y	Y	U.S.	Girls	8-10	NR	BMI ≥ the 25 <sup>th</sup> pctl, or < BMI – 35 or at least 1 parent with a BMI > r than 25	303	104	100	9.3	NR	African-American: 100
<b>Community/ Home/ PC/CC</b>													
de Silva-Sanigorski, 2010 <sup>188</sup>	N	Y	Australia	NR	0-5	NR	NR	43,811	208	NR	[2-4]	NR	NR
Community/ School/ PC/CC													
Chang, 2010 <sup>189</sup>	N	Y	US	NR	NR	NR	NR	NR	208	NR	NR	NR	WNH, Arm1:(35.9) Arm2:(35.4) Arm3:(22.9) Arm4:(38) Arm5:(37.3)

API = Asian Pacific Islander; BMI = body mass index (in kg/m<sup>2</sup>); BNH = Black non-Hispanic, N = no; NR = not reported; RCT = randomized controlled trials; WNH = White non-Hispanic; Y = yes\*Inclusion/exclusion criteria.

<sup>†</sup>Participant characteristics.

**Table 33. Interventions of studies based in the community**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
<b>Community Only</b>						
Eiholzer, 2010 <sup>182</sup>	Usual care	The resistance exercise program consisted of supervised 1-hour exercise sessions twice weekly.			X	X
<b>Community/ School</b>						
Sallis, 2003 <sup>75</sup>	Usual care	School activities/components including physical education classes, school food sources. Statewide regulatory changes to reduce sedentary behavior and promote healthy lifestyle; childcare technical assistance; training around healthy habits.	X		X	X
Singh, 2009 <sup>183</sup>	Usual care	Classroom based educational program that covered 11 lessons for the subjects of biology and physical education. Aimed at raising awareness and information processing with regard to energy balance-related behaviors; Aimed at facilitation of choice to improve 1 of the risk behaviors.	X	X	X	X
Chomitz, 2010 <sup>184</sup>	Usual care	Healthy eating and active living through a poster campaign, newsletters, mini-grants. Innovative food service projects such as new recipe and menu development and cafeteria taste-tests were developed. Raise community awareness of resources available in the city to promote active living through a poster campaign. Physical education programs were implemented at all 12 K-8 schools similarly to improve access to physical activity opportunities.	X	X	X	X
<b>Community/ School/ Home</b>						
Economos, 2007 <sup>185</sup>	Usual care	Breakfast program; walk to school campaign; professional development for staff; school food service; classroom curriculum; Enhanced recess; school wellness policy development; after school SUS curriculum; walk from school campaign. Parent outreach and educational information; family events; nutrition forums; Child's health report card. Community or environment-level: SUS Community Advisory Council; Ethnic-minority collaborations; walking trainings; Farmers Market; City Employee Wellness Campaign; SUS approved restaurants; SUS 5K & Fitness fair; media placement; collaboration on health events.	X	X	X	X

**Table 33. Interventions of studies based in the community (continued)**

Author, Year	Control Arm	Description of Intervention	Diet (Phys/Env)	Diet (Psych)	Physical Activity (Phys/Env)	Physical Activity (Psych)
<b><i>Community/ Home</i></b>						
Klesges, 2012 <sup>187</sup>	Both groups received the same intervention for 1 year. After first year program included social awareness and community responsibility	Practical experience with nutrition and physical activity by way of interactive learning. The girls developed behavioral goals to eat a nutritional diet, increase physical activity, and reduce sedentary activity.		X		X
Robinson, 2010 <sup>186</sup>	Usual care	Daily 1-hour homework period and small snack followed by 45 to 60 minutes of learning and practicing dance routines. Home-based screen time reduction intervention designed to incorporate African or African American history and culture.	X			X
<b><i>Community/ Home/ PC/CC</i></b>						
de Silva-Sanigorski, 2010 <sup>188</sup>	Usual care	Increase awareness of key messages in homes, primary care, and childcare settings. Promote healthy eating, distribute water bottles, active play.	X	X	X	X
<b><i>Community/ School/ PC/CC</i></b>						
Chang, 2010 <sup>189</sup>	Usual care	Wellness programs; assessment of student fitness; promote healthy eating/physical education/activity, training of childcare providers about healthy behaviors Implementation of Expert Committee recommendations on assessment, prevention and treatment of child and adolescent overweight Implementation of policy and practice changes with organizations such as YMCA Childcare	X	X	X	X

CC = childcare; PC = primary care; Psych = psychosocial intervention; Phys/Env = physical/environmental intervention

## **Outcomes**

### **Diet Interventions**

None reported.

### **Physical Activity Interventions**

#### **Weight-Related Outcomes**

##### **Percent Body Fat**

There was no difference in percent body fat between the intervention and control groups at baseline and followup (Appendix E, Evidence Table 54a).<sup>182</sup>

##### **Clinical Outcomes**

None reported.

##### **Adverse Events**

None reported.

#### **Intermediate Outcomes**

This study reported a significant increase in physical activity ( $p=0.01$ ) as indicated by in the spontaneous activity energy expenditure (SpAEE), kcal/min (Appendix E, Evidence Table 54b).<sup>182</sup>

#### **Interpretation**

The results from an outcome measure from one community only-based study reporting on a physical activity intervention support our conclusion. The study reported on percent body fat and showed no significant change over 1 year. However, it did show a significant increase in physical activity. The study enrolled a small sample of boys only and aimed to increase spontaneous activity. It did not include dietary components. We need more physical activity interventions among larger, more diverse populations to further evaluate the impact of these interventions.

### **Diet and Physical Activity Interventions**

None reported.

## **Strength of the Evidence**

#### **Weight-Related Outcomes**

The strength of evidence is insufficient that community-only based physical activity interventions prevent obesity or overweight in children (Table 34; Appendix F, Strength of Evidence Table 1).

#### **Intermediate Outcomes**

There was insufficient evidence to grade intermediate outcomes of physical activity interventions.

**Table 34. Summary of the strength of evidence for weight-related outcomes in studies taking place in community-only settings**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/ Moderate/ High Risk of Bias(n)	% With Favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Community- only	PA, 1	2010	46	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Insufficient

PA = physical activity intervention; NA = not applicable



## **Community-School–Based Studies**

### **Study Characteristics**

There were three studies, including two RCTs,<sup>75,183</sup> and one non-RCT.<sup>184</sup> Their stated goal was obesity prevention or weight maintenance. Two studies took place in the U.S.,<sup>75,184</sup> and the other in the Netherlands.<sup>183</sup> Two studies did not report inclusion criteria,<sup>75,183</sup> the other only included children under 5 years old (Table 32; Appendix E, Evidence Table 55).<sup>184</sup>

### **Population Characteristics**

Two studies included a total of 2,966 participants and one study included 24 schools with a mean enrollment of 1,109 at each school. One study had a followup of 156 weeks,<sup>184</sup> one study had a followup of between 32-80 weeks<sup>183</sup>, and one study had a followup of 104 weeks.<sup>75</sup> The proportion of females ranged from 48.2<sup>184</sup> to 53.3<sup>183</sup> percent in these studies. Two studies did not report on age.<sup>183</sup> Mean age ranged from 7.7 years<sup>184</sup> to 12.7 years.<sup>183</sup> None of the studies reported on the grade of the participants. Two studies reported on race (Table 32; Appendix E, Evidence Table 56).<sup>75,184</sup>

### **Interventions**

All three studies reported on combined diet and physical activity interventions (Table 33; Appendix E, Evidence Table 57).<sup>183</sup>

### **Outcomes**

#### **Diet Interventions**

None Reported.

#### **Physical Activity Interventions**

None Reported.

### **Diet and Physical Activity Interventions**

#### **Weight-Related Outcomes**

##### **BMI z-Score**

One study reported on change in BMI z score and showed a decrease (0.67 vs. 0.63,  $p < 0.001$ ) (Appendix E, Evidence Table 58a,b).<sup>184</sup>

##### **BMI**

Two studies reported on BMI. One did not observe any differences in BMI between the intervention and control groups<sup>183</sup> and one observed differences among males but not females<sup>75</sup> (Appendix E, Evidence Table 58a,b).

##### **Prevalence of Overweight and Obesity**

One study reported on the prevalence of obesity and showed a decrease (20.2 percent vs. 18.0 percent,  $p < 0.05$ ) (Appendix E, Evidence Table 58a,b).<sup>184</sup>

This study also reported on subgroups; the sum of skinfold thickness was lower in girls in intervention schools at both a 32-week followup (-2.3mm; 95% CI: -4.3, -0.03mm) and 240-week followup (-2.0mm; 95% CI: -3.9, -0.1mm) (Appendix E, Evidence Table 58).<sup>183</sup> Additionally, Black and Hispanic children were more likely to be obese at baseline (27 percent and 28.5 percent, respectively) compared to white (12.6 percent) and Asian children (14.3 percent). But obesity along all race/ethnicity groups declined during the study (Appendix E, Evidence Table 58a,b).

### **Waist Circumference**

One study reported on waist circumference change. For males, waist circumference was lower in the intervention group at a 32-week followup (-0.6cm; 95% CI: -1.1 to -0.1cm), but at a 20-month followup waist circumference was significantly lower in the control group (Appendix E, Evidence Table 58a,b).<sup>183</sup>

### **Skinfold Thickness**

One study reported on skinfold thickness change. At the 240 week followup, bicep skinfold thickness among females was lower (-0.7mm; 95% CI: -1.3, -0.04mm) (Appendix E, Evidence Table 58a,b).<sup>183</sup>

### **Clinical Outcomes**

None reported.

### **Adverse Events**

None reported.

### **Intermediate Outcomes**

#### **Physical Activity and Sedentary Behavior**

One study measured the impact of this intervention on endurance and fitness.<sup>184</sup> The percent that passed the endurance cardiovascular test significantly increased from 52.6 to 66.6 percent (14.0 percent increase,  $p < 0.001$ ) in the intervention group. One study<sup>183</sup> measured active commuting (walking) to school and found no significant difference between groups. This study also reported on consumption of sugar-sweetened beverages and found no difference between the control and interventions. One study measured moderate to vigorous physical activity, sedentary hours, and fatty foods and found no significant differences between groups (Appendix E, Evidence Table 58c).

### **Interpretation**

The results from outcome measures from two community/school-based studies reporting on combined interventions support our conclusions. One study reported on BMI z-score and showed a significant decrease. Two studies reported on BMI and one showed a significant decrease. These interventions focused on education and environmental changes promoting a healthy diet and physical activity. We may need more interventions combining diet and physical activity to further evaluate the impact of these interventions.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of evidence is moderate that community/school based diet and physical activity interventions prevent obesity or overweight in children (Table 35, Appendix F, Strength of Evidence Table 1). No studies measured adverse events.

### **Intermediate Outcomes**

There was insufficient evidence to grade intermediate outcomes of combination interventions.

**Table 35. Summary of the strength of evidence for weight-related outcomes in studies taking place in community settings with a school component**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable (Statistically Sig) outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Community-School	C, 3	1997-2010	2966 and 24 schools (mean enrollment 1,109)	0/3/0	66	66	Moderate	Consistent	Imprecise	Direct	Moderate

C = combination of diet and physical activity interventions

## **Community-School-Home–Based Studies**

### **Study Characteristics**

One non-RCT study took place in this setting and the goal of this study was not weight maintenance. This study took place in the U.S. (Table 32; Appendix E, Evidence Table 59).<sup>185</sup>

### **Population Characteristics**

This study included 1,178 participants whose mean age was between 7.3 and 7.9 years old. Participants were in grades 1-3, and were of mixed ethnicity (Table 32; Appendix E, Evidence Table 60).<sup>185</sup>

### **Interventions**

This study reported on a combination of diet and physical activity intervention (Table 33; Appendix E, Evidence Table 61).<sup>185</sup>

### **Outcomes**

#### **Diet Interventions**

None reported.

#### **Physical Activity Interventions**

None reported.

#### **Diet and Physical Activity Interventions**

One non-RCT reported on a diet, physical activity and change in sedentary behavior intervention.<sup>185</sup> The study randomized 1,178 participants and analyzed 1,178 at 43 weeks.

### **Weight-Related Outcomes**

#### **BMI z-Score**

In the intervention community, BMI z-score decreased by -0.1005 ( $p = 0.001$ ) compared with children in the control communities (Appendix E, Evidence Table 62a,b).<sup>185</sup>

#### **Clinical Outcomes**

None reported.

#### **Adverse Events**

None reported.

#### **Intermediate Outcomes**

None reported.

### **Interpretations**

The results from outcome measures from one community/school/home-based study reporting on a combination intervention support our conclusions. This study showed a significant decrease in BMI z-score over 1 year. The study was conducted in a community in Massachusetts with

components in the school and the home. We need more diet and physical activity intervention studies among diverse populations.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of evidence is insufficient that community/school/home based interventions which target a combination of diet and physical activity prevent obesity or overweight in children. No studies measured adverse events. No studies measured intermediate outcomes (Table 36, Appendix F, Strength of Evidence Table 1).

**Table 36. Summary of the strength of evidence for weight-related outcomes in studies taking place in community settings with a school and home component**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Community-School-Home	C, 1	2007-2008	1326	0/1/0	100	100	Moderate	NA	Imprecise	Direct	Insufficient

C = combination of diet and physical activity interventions

## **Community-Home–Based Studies**

### **Study Characteristics**

Two RCTs were included in this setting.<sup>186,187</sup> Both studies included only girls in elementary school who were African-American girls aged 8 to 10 years old.<sup>186,187</sup> One study included only participants with a BMI at or higher than the 25<sup>th</sup> percentile or had a parent with a BMI of 25 or higher<sup>187</sup> (Table 32; Appendix E, Evidence Table 63).

### **Population Characteristics**

The two studies include 924 participants. Length of followup was 104 weeks for both studies. Participants were on average 9.3 to 9.4 years old and were all African-American (Table 32; Appendix E, Evidence Table 64).<sup>186</sup>

### **Interventions**

Both studies tested a combined diet and physical activity intervention (Table 33; Appendix E, Evidence Table 65).<sup>186,187</sup>

### **Outcomes**

#### **Diet Interventions**

None reported.

#### **Physical Activity Interventions**

None reported.

### **Diet and Physical Activity Interventions**

#### **Weight-Related Outcomes**

##### **BMI z-Score**

Changes in BMI z-score did not differ between the two intervention groups (Appendix E, Evidence Table 66a).<sup>186</sup>

##### **BMI**

Changes in BMI did not differ between the intervention group and the control for either study (Appendix E, Evidence Table 66a).<sup>186,187</sup>

##### **Prevalence of Overweight and Obesity**

Changes in BMI  $\geq$  95<sup>th</sup> percentile did not differ between the two intervention groups. (Appendix E, Evidence Table 66a).<sup>186</sup>

##### **Waist Circumference**

Changes in waist circumference did not differ between the intervention group and the control for either study (Appendix E, Evidence Table 66a).<sup>186,187</sup>



### **Skinfold Thickness**

Changes in triceps skinfold did not differ between intervention group and the control for either study (Appendix E, Evidence Table 66a).<sup>186,187</sup>

### **Clinical Outcomes**

Changes in systolic blood pressure did not differ between the two intervention groups. Changes in diastolic blood pressure did not differ between the two intervention groups (Appendix E, Evidence Table 66b).<sup>186</sup>

### **Adverse Events**

None reported.

### **Intermediate Outcomes**

#### **Physical Activity and Sedentary Behavior**

Group difference in changes in the intermediate outcomes including weekday, weekend and after-school moderate-to-vigorous physical activity, weekday/weekend screen time, total daily energy intake as well as average percentage of energy from fat were all in the expected direction, but did not reach statistical significance (Appendix E, Evidence Table 66c).<sup>186,187</sup>

#### **Physical Activity and Sedentary Behavior**

One study reported on change in dietary intake. This study reported on sugar sweetened beverage intake, and found a nonsignificant decrease in favor of the intervention. This study reported a significant increase in water consumption in the intervention group ( $p=0.02$ ). Fruit and vegetable intake also increased in the intervention group but was not significant ( $p=0.07$ ) (Appendix E, Evidence Table 66c).<sup>187</sup>

### **Interpretation**

We can make limited conclusions regarding community- and home-based studies reporting diet and physical activity interventions. The studies reported on BMI z-score, BMI, waist circumference, and skinfold thickness over two years but did not show significant differences between the two groups. The studies took place among small samples of African-American girls. The health education and physical activity interventions took place in different study groups; therefore the participants did not receive both the diet and physical activity intervention. We need more diet and physical activity intervention studies among larger, more diverse populations to further evaluate the impact of this intervention.

### **Strength of the Evidence**

#### **Weight-Related Outcomes**

The strength of evidence is insufficient that community/ home-based interventions using a combined diet and physical activity intervention prevent obesity or overweight in children (Table 37, Appendix F, Strength of Evidence Table 1).

#### **Intermediate Outcomes**

There was insufficient evidence to grade intermediate outcomes of combined diet and physical activity interventions (Appendix F, Strength of Evidence Tables 2 and 7).

**Table 37. Summary of the strength of evidence for weight-related outcomes in studies taking place in community settings with a home component**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/Moderate/High Risk of Bias(n)	% With Favorable Outcome (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Community-Home	C, 2	2010	564	0/1/1	0	0	Moderate	Consistent	Imprecise	Direct	Insufficient

C = combination diet and physical activity interventions; NA = not applicable

## **Community-Home-Primary Care and Childcare–Based Studies**

### **Study Characteristics**

We included one quasi-experimental Australian study that took place in this setting and had a stated goal of obesity prevention. The study reported on a diet, physical activity, and change in sedentary behavior<sup>188</sup>. The study randomized 2,202 participants and analyzed 2,393 at 103 weeks. This study included children between the ages of 0 and 5 years old. The study did not report any other inclusion criteria (Table 32; Appendix E, Evidence Table 67).<sup>188</sup>

### **Population Characteristics**

This study included a total of 43,811 participants whose mean age was between 2 and 4 years old. The study did not report any other participant characteristics (Table 32; Appendix E, Evidence Table 68).<sup>188</sup>

### **Interventions**

This study investigated the combination intervention of diet and physical activity (Table 33; Appendix E, Evidence Table 69).<sup>188</sup>

### **Outcomes**

#### **Diet Interventions**

None reported.

#### **Physical Activity Interventions**

None reported.

### **Diet and Physical Activity Interventions**

#### **Weight-Related Outcomes**

##### **BMI z-Score**

In the intervention group, there was a significantly lower BMI z-score in the 3.5-year-old subsample (0.67 vs. 0.54,  $p < 0.05$ ) (Appendix E, Evidence Table 70a,b).<sup>188</sup>

##### **BMI**

In the intervention group, there was a significantly lower BMI in the 3.5-year-old subsample (16.35 kg/m<sup>2</sup> vs. 16.17 kg/m<sup>2</sup>,  $p < 0.05$ ) (Appendix E, Evidence Table 70a,b).<sup>188</sup>

##### **Weight**

In the intervention group, there was a significantly lower weight in the 3.5-year-old subsample (17.05 kg vs. 16.76 kg,  $p < 0.05$ ) (Appendix E, Evidence Table 70a,b).<sup>188</sup>

##### **Prevalence of Overweight and Obesity**

In the intervention group, there was a significantly lower prevalence of overweight/obesity in the 2 and 3.5-year-old subsample (by 2.5 and 3.4 percentage points, respectively) than there was

in the comparison sample (a difference of 0.7 percentage points,  $p < 0.05$ ) (Appendix E, Evidence Table 70a,b).<sup>188</sup>

### **Clinical Outcomes**

None reported.

### **Adverse Events**

None reported.

### **Intermediate Outcomes**

None reported.

### **Interpretation**

We can make no conclusions regarding community, home, primary care, and childcare-based studies reporting on a combined intervention. The single study showed a significant decrease in BMI, BMI z-score, and weight among young children (3.5 years) over 4 years. The study took place in a community in Australia with components in the school, primary care, and child-care settings. We need more diet and physical activity interventions among diverse populations to further evaluate the impact of this intervention.

### **Strength of the Evidence**

The strength of evidence is insufficient that community-home-primary care-child-care -based diet and physical activity interventions prevent obesity or overweight in children (Table 38, Appendix F, Strength of Evidence Table 1).

**Table 38. Summary of the strength of evidence for weight-related outcomes in studies taking place in community settings with home, primary care, and child-care components**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/ Moderate/ High Risk of Bias(n)	% With Favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Community -Home-PC- CC	C, 1	2010	43,811	0/1/0	100	100	Moderate	NA	Imprecise	Direct	Insufficient

C = combination diet and physical activity interventions; NA = not applicable; PC=primary care; CC = childcare

## **Community-School-Primary Care-Childcare–Based Studies**

### **Study Characteristics**

We included one quasi-experimental study conducted in the U.S. in this setting with the stated goal of obesity prevention. The study reported on a combined diet and physical activity intervention, which randomized 2,202 participants<sup>189</sup>. It did not define any inclusion criteria (Table 32; Appendix E, Evidence Table 71).<sup>189</sup>

### **Population Characteristics**

This study included a total of 2,202 participants. It did not report any other participant characteristics (Table 32; Appendix E, Evidence Table 72).<sup>189</sup>

### **Interventions**

This study investigated a diet intervention (Table 33; Appendix E, Evidence Table 73).<sup>189</sup>

### **Outcomes**

#### **Diet Interventions**

None reported

#### **Physical Activity Interventions**

None reported.

#### **Diet and Physical Activity Interventions**

### **Weight-Related Outcomes**

#### **Prevalence of Overweight and Obesity**

In the intervention group, there was no significant change in the prevalence of obesity (20.6 vs. 24.2 percent) or prevalence of overweight (17 vs. 17 percent) (Appendix E, Evidence Table 74a).<sup>189</sup>

#### **Clinical Outcomes**

None reported.

#### **Adverse Events**

None reported.

#### **Intermediate Outcomes**

None reported.

### **Interpretation**

We can make no conclusions regarding community, school, primary care, and child-care center-based studies reporting on a combined intervention. The single diet and physical activity study showed no significant change in the prevalence of obesity over three years. The study took place in a community in Delaware with components in the school, primary care and child-care

settings. We need more diet and physical activity interventions among diverse populations to further evaluate the impact of these interventions.

## **Strength of the Evidence**

### **Weight-Related Outcomes**

The strength of evidence is insufficient that community/ home/primary care/child-care center-based combined diet and physical activity interventions prevent obesity or overweight in children (Table 39, Appendix F, Strength of Evidence Table 1). No studies measured adverse events.

**Table 39. Summary of the strength of evidence for weight-related outcomes in studies taking place in community settings with school, primary care, and child-care components**

Setting	Intervention, n	Years of Publication	Enrolled Participants	Studies With Low/ Moderate/ High Risk of Bias(n)	% With favorable (Statistically Sig) Outcome	% With Favorable Outcome (Does Not Need to be Stat Sig)	Risk of Bias	Consistency	Precision	Directness	Strength of the Evidence
Community-School-PC-CC	C, 1	2010	NR	0/0/1	100	100	High	Inconsistent	Imprecise	Direct	Insufficient

C = combination diet and physical activity intervention; NA = not applicable; PC = primary care; CC = childcare



## Key Question 6: What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or overweight in children?

We identified six studies that met our inclusion criteria that evaluated the effects of consumer health informatics (CHI) interventions, but they took place primarily in other settings, and thus we reported them under other KQs.

KQ 1 included five studies with a consumer health informatics component: four on school-based setting with a CHI component to the intervention,<sup>165-168</sup> and one on school-based setting with a home and CHI component.<sup>170</sup> Two of the school-CHI studies reported on physical activity interventions and showed no significant intervention effect on weight outcomes,<sup>165,167</sup> and two reported on combined diet and physical activity interventions,<sup>166,168</sup> and one showed a significant intervention effect on BMI ( $p < 0.001$ ),<sup>166</sup> while the other failed to show an intervention effect. The study reporting on the school-home-CHI intervention used a combined diet and physical activity intervention and demonstrated no intervention effect on weight outcomes.<sup>170</sup>

KQ 2 included one study with a CHI component: the study took place in a home-based setting with primary care and CHI components.<sup>175</sup> This study used a combination diet and physical activity intervention and showed no difference in BMI z-score between the intervention and control during followup after adjusting for baseline BMI z-score, age, and ethnicity, and significant improvements in sedentary behaviors for both genders and active days per week among boys. Subgroup analysis for participants with BMI at or above 95th percentile showed a desirable but insignificant intervention effect: BMI z-score was  $2.08 \pm 0.02$  for intervention and  $2.12 \pm 0.02$  for the control during followup ( $P = .10$ ). The intervention did not demonstrate an overall effect on BMI z scores.

The six CHI intervention studies identified only took place in concert with other interventions, primarily school-based, and also home-based physical activity and dietary interventions. CHI interventions contributed to improvements in intermediate outcomes, particularly physical activity, but only one<sup>166</sup> of these six studies, which used a school-based diet and physical activity intervention, in concert with a CHI component, demonstrated a change in weight outcomes.

# Discussion

## Key Findings

We identified 124 interventional studies (described in 131 articles) meeting our inclusion criteria, of which 54 took place in the United States and 70 were in other developed countries. Eighty-three studies were RCTs. The majority (104 studies, 84 percent) were school-based studies, although many of them also included interventions implemented in other settings such as in the home or local community. Few studies tested interventions that were primarily implemented in other settings such as at home, in communities, in primary care settings, or in childcare settings.

The evidence is strong to support some interventions. The school based studies of physical activity, which included a home component, all improved obesity outcomes. Two of the three studies targeted a reduction in sedentary activity which may have contributed to the good outcomes. Combination interventions of diet and physical activity interventions in schools, with home and community components, also effectively improved outcomes (Table 40).

Additionally, there is moderate evidence that using dietary interventions or physical activity interventions, alone, in schools prevent obesity. The dietary interventions in the school setting included education of the children which may have contributed to their success. However, the paucity of studies makes it hard to know why these particular interventions worked. The strength of the evidence is also moderate that combinations of diet and physical activity in school, with a home component, positively impacts obesity prevalence. The diet and physical activity interventions included enhanced classroom physical activity lessons, moderate to vigorous physical activity sessions, nutritional education materials, and healthful diet promotion (Table 40).

The strength of evidence is low that diet and physical activity interventions administered at home, or in child-care facilities, prevent obesity or overweight in children. Those interventions with significant parental or family involvement were able to demonstrate some impact on select intermediate outcomes. However, additional studies with larger sample sizes, greater intensity interventions and longer followup may be necessary to know the impact of diet and physical activity interventions delivered at home. The small sample size and poor quality of the child-care based studies may have contributed to the attenuated effect on weight outcomes (Table 40).

The evidence is insufficient regarding interventions in other settings. This is due primarily to the small number of studies, their moderate or high risk of bias, or conflicting results across studies. We note that there were many studies that combined diet and physical activity interventions in schools and yet the evidence remains insufficient about these combined interventions. These thirty-seven studies had results that were imprecise and largely inconsistent with each other preventing conclusions (Table 40).

Almost all of those studies that reported on intermediate outcomes, such as vegetable and fruit consumption and/or physical activity, detected some statistically significant desirable effects. Similarly, roughly half of the studies that reported clinical outcomes detected some statistically significant desirable effects, predominately lowered blood pressure.

In general, we found that studies done in schools that had large sample sizes, longer follow up, with more vigorous and higher intensity interventions, were more likely to be effective. Comprehensive interventions that promoted environmental changes (e.g., modified food and beverage items offered in school cafeteria, or structural changes in school physical activity) as well as changes in individuals' knowledge and attitude were more likely to be successful than

those addressing either one alone. Educational interventions were less likely to be effective than environmental changes. Given that children are exposed to many other influences outside of school, it is heartening to see that interventions implemented in schools can have a significant impact on weight and other outcomes.

**Table 40. Summary of conclusions**

KQ/Setting	Intervention	Conclusion	SOE
School	Diet	Benefit	Moderate
	Physical activity	Benefit	Moderate
	Combination	No conclusion, inconsistent results	Insufficient
School-Home	Diet	Not enough evidence to reach conclusion	Insufficient
	Physical activity	Benefit	High
	Combination	Benefit	Moderate
School-Home-Community	Physical activity	Not enough evidence to reach conclusion	Insufficient
	Combination	Benefit	High
School-Community	Diet	Not enough evidence to reach conclusion	Insufficient
	Physical activity	Not enough evidence to reach conclusion	Insufficient
	Combination	Benefit	Moderate
School-CHI	Physical activity	No conclusion, inconsistent results	Insufficient
	Combination	No conclusion, inconsistent results	Insufficient
School-Home-CHI	Combination	Not enough evidence to reach conclusion	Insufficient
Home	Diet	Not enough evidence to reach conclusion	Insufficient
	Combination	No benefit	Low
Home-School-Community	Combination	Not enough evidence to reach conclusion	Insufficient
Home-PC-CHI	Combination	Not enough evidence to reach conclusion	Insufficient
Primary care	Combination	Not enough evidence to reach conclusion	Insufficient
Childcare	Combination	No benefit	Low
	Physical activity	Not enough evidence to reach conclusion	Insufficient
Community	Physical activity	Not enough evidence to reach conclusion	Insufficient
Community-school	Combination	Benefit	Moderate
Community-School-Home	Combination	Not enough evidence to reach conclusion	Insufficient
Community-Home	Combination	No conclusion, high risk of bias studies	Insufficient
Community-Home-PC-CC	Combination	Not enough evidence to reach conclusion	Insufficient
Community-Home-PC-CC	Combination	Not enough evidence to reach conclusion	Insufficient

Combination = combination of a diet and physical activity intervention; CHI = consumer thelath informatics; CC = childcare; PC = primary care

## Important Unanswered Questions

### What Is the Optimal Setting for Childhood Obesity Prevention Interventions?

This review did not aim to compare interventions across settings, and it remains an unanswered question as to where interventions are best implemented. Are physical activity interventions most effective when implemented in school or in an aftercare setting? Is diet education most effective when done in school or at home visits?

This review confirmed that most obesity prevention interventions have been tested in schools, consistent with previous findings.<sup>190,191</sup> An Institute of Medicine report on childhood obesity recommended school as the national focal point for obesity prevention in the U.S.<sup>192</sup> We suggest, however, that while the school is the setting most commonly studied, it may not be the optimal

setting for obesity prevention programs. Many experts support that obesity is driven by a host of environmental factors which increase opportunities for energy intake and decrease opportunities for energy expenditure.<sup>193</sup> Obesity-prevention interventions based in schools may not be effective in reducing the risks posted in other settings. When sufficient studies have been conducted, cross-setting analysis of interventions will be desirable. Head-to-head comparisons of comparable interventions delivered in disparate settings may be needed.

## **What Are the Other Beneficial Effects and Unwanted Consequences of Obesity Prevention?**

We hypothesized that obesity prevention programs could result in desirable clinical outcomes even when the intervention did not result in weight control. In this report, we describe select clinical outcomes that are influenced by obesity, including blood pressure and blood lipids and the effect of interventions. The question is whether interventions that affect only intermediate outcomes, like dietary choices and physical activity, also have a beneficial effect on health. Given the long interval between exposure and the outcomes, these hypotheses are difficult to test and typically require observational designs.

Obesity prevention interventions may also result in some unwanted consequences for children and their families, such as stigma,<sup>194</sup> low self-esteem,<sup>195</sup> injury (due to physical activity), eating disorders,<sup>196</sup> or impaired growth.<sup>197</sup> However, very few studies we reviewed reported on such adverse effects. Failure to report adverse effects can mask the reasons for why the interventions generally showed small effects. Low self-esteem or stigmatization as a result of the intervention may reduce fidelity to the intervention and hinder participants from adhering.

## **Does the Effectiveness of Obesity Prevention Differ in Subgroups?**

A few studies examined whether the effect of the intervention varied across groups defined by gender, age, or baseline weight status, but reported mixed results. Very few studies examined other characteristics, such as race/ethnicity or socio-economic status. We need future research focusing on sub-populations. In some studies, children with different socio-demographic characteristics responded differently to the same intervention. For example, a combined dietary and physical activity intervention that involved the children's schools, homes, and communities was effective in elementary school children, but not in middle-school students.<sup>148</sup> Another intervention provided health and nutrition education to pupils in Crete and found girls to be more responsive to the intervention than boys.<sup>78</sup> A community-based after-school program found an important decrease in BMI z-scores among Asian American children, with an unanticipated increase in African American children.<sup>162</sup> Such differences may be explained by fidelity to the intervention, cultural responses to the intervention, or differences in growth patterns. However, evidence is still limited to explain this variation.

Our limited findings related to sub-populations are similar to previous reviews. For example, one review reported that efforts to prevent weight gain were more effective in children aged 6 to 12 than in older children.<sup>191</sup> Another review found that girls may be more responsive to interventions built on the social learning theory, while boys may be more responsive to structural or environmental approaches.<sup>198</sup> This suggests the need for stratified analyses of pre-specified sub-groups to assess the effects of the interventions in these subgroups.

## Findings in Relationship to What Is Already Known

In general, our main findings are consistent with previous systematic reviews. However, we are unaware of other reviews which have provided a comprehensive examination of diverse study settings like ours. Most other reviewers mainly focused on select settings such as school and on select outcomes such as BMI or prevalence of overweight and obesity. This review also provides some new findings. We found that a large majority (103, 82 percent) of the 125 studies are school-based, and few studies have tested interventions in other settings. Previous reviews<sup>190,198,199</sup> have focused primarily on schools, while a few recent reviews examined other settings.<sup>191,200</sup> Earlier reviews focused primarily on weight outcomes, such as BMI, while we included various weight and adiposity outcomes as well as clinical and intermediate outcomes. We also described adverse effects.

The results of previous reviews looking at the impact obesity prevention on weight outcomes in the school setting are mixed. Some did not detect significant intervention effects, while some did.<sup>191,200</sup> Most reviews described modest or mixed effects of obesity prevention interventions in children across all settings,<sup>201-203</sup> or within schools;<sup>190,198</sup> and there was limited evidence in support of school policies and regulations.<sup>199</sup> The inconsistent findings are largely due to differences in the design of the reviews, their methods, and the quality of the primary literature (e.g., small study size, lack of blinding, short followup, and varied statistical analyses).<sup>191,203,204</sup>

Overall, our findings are consistent with the Institute of Medicine's recommendations<sup>192</sup> about obesity prevention. The Institute of Medicine reported that a) the school is the most frequent setting to be studied and included in meta-analysis or review; b) despite small effect sizes and sometimes inconsistent evidence, there is a cumulative body of research showing that school-based interventions can prevent obesity; c) school-based interventions modifying both diet and physical activity are more effective in preventing childhood obesity than modifying either diet or physical activity alone; d) school-based interventions, with family or community involvement, are more likely to be effective; e) different stakeholders, including governments, community, health care systems, industry, and educators should work together to modify the obesogenic environment to facilitate healthful behaviors;<sup>205</sup> and f) we need more research to test interventions in settings other than schools, in particular, those that test environmental and policy changes, as well as those in clinical settings.

However, discrepancies between findings from our study and previous reviews still exist, especially in the magnitude of intervention effect. For example, while our study generally found a low to moderate intervention effect for school-based intervention programs (with a few exceptions of large intervention effect for physical activity interventions in school-home settings and combined diet and physical activity interventions in school-community settings), the most recent Cochrane review on childhood obesity preventions showed strong evidence to support the beneficial effects of school-based intervention programs for children, particularly among those aged 6 to 12 years,<sup>205</sup> while another systematic review on 18 studies did not find any significant improvements in BMI from school-based physical activity interventions.<sup>206</sup>

## Applicability

The results of this review are primarily applicable to children in high-income countries. Results are not necessarily applicable to children in middle- and low-income countries. The children enrolled in the reviewed studies were diverse across studies, with a mix of girls and boys of multiple ethnic groups. However, only a small number of studies reported outcomes by

the subgroups of sex, race/ethnicity, or age. Therefore, one should apply the results cautiously to subgroups of children, particularly subgroups that only a few studies included, such as very young children and select racial/ethnic groups. Also, prevention strategies that were effective in old studies may not be as effective in current populations due to differences in the social and build environments.

We gave more weight in our evidence grading to RCTs than non-RCTs). For the most part, the RCTs included in this review took place in school settings. Thus, there may be a relative understating of the value of interventions in non-school settings.

## Implications for Clinical and Policy Decisionmaking

The findings from this review can help guide decision making by researchers, clinicians, public health practitioners, and policymakers about the most effective settings and types of interventions for preventing childhood obesity in developed countries. Based on these results and the results of previous reviews, school-based interventions are likely to remain a focal point for prevention interventions. The limited number of studies conducted outside school limits the evidence about the effectiveness of interventions in those settings.

We anticipate that the school will remain a key setting for health promotion, including for childhood obesity prevention. Several factors favor school-focused efforts: (1) it is easier to conduct continuous interventions and followup measurements in school than in less standardized settings; (2) dietary and exercise behaviors at school constitute a large proportion of children's daily diet and physical activity; (3) schools have the relevant infrastructure to deliver intervention and evaluation, including annual physical check-ups, nutrition and physical education teachers, and school nurses; (4) the majority of school-age children in high-income countries attend and spend considerable time at school; and (5) the evidence supports the effectiveness of some school-based interventions.

To date, it has been unclear whether physical activity or diet (or the combination) should be the primary focus of population-based obesity intervention programs. We found a higher strength of evidence for physical activity interventions in schools that included a home component than for diet-only interventions. However, studies testing these interventions head-to-head were rare, so our review does not definitely answer this question. Nevertheless, to maintain a desirable energy balance, it may be easier to control energy intake than to increase energy expenditure, as there are biological limitations to the effectiveness of physical activity alone in controlling body weight, as well as social and environmental challenges to fitting activity into children's daily schedule. In addition, the environmental factors that affect food consumption in schools might be easier and less costly to modify than those affecting physical activity. However, we note that there may be opportunity costs if schools are required to divert attention and resources to these activities at the expense of other learning or enrichment activities.

Policy change is difficult to effect; nevertheless, in recent years, there is strong interest in the U.S. and some other industrialized countries to push community and policy based interventions. It is likely that with the growing government and public support, such interventions could become more feasible and sustainable in the future. We note that although the evidence is insufficient to address harms, policy makers implementing intervention programs might consider *potential* harms, which may include self-esteem effects, a sense of failure, and time diverted from other activities. When choosing an intervention to implement, decision makers need to consider the availability of resources; the costs, potential harms and unwanted consequences of an intervention; the anticipated magnitude of the effectiveness of the program, as well as the

other underlying issues contributing to the obesity problem specific to their population, such as specific risk factors and other competitive needs.

## **Limitations of the Evidence Review Process**

This review included only studies of normal children in high-income countries, thereby limiting the generalizability of these findings to high-risk groups and low- and middle-income countries.

Publication bias is inevitable in this review, as journals are less likely to publish intervention studies failing to achieve a desirable effect. We partially addressed this bias, as we searched for “gray literature” (e.g. unpublished working papers) to include in our review. However, none of the grey literature studies met our inclusion criteria in this search.

Within each study setting, we grouped interventions by their behavioral changes (e.g., diet, physical activity, or both) although the studies might have applied very different intervention approaches. However, due to the limited number of studies by categories, we could not conduct further stratifications and analyses to explore the comparative effectiveness of the specific intervention approaches (e.g., education intervention vs. environmental change), or specific intermediate outcomes (e.g., fruits and vegetable intake vs. total energy intake). Moreover, none of the interventions was identical to another. We synthesized the evidence at the level of the intervention – this may be interpreted as “physical activity” is beneficial or as “both diet and PA” is beneficial – even if the report cannot support what specific intervention has the strongest evidence relative to another.

For studies with multiple time points during followup assessments, we mainly included the final one, reasoning that the final followup could best demonstrate how the effect of a specific intervention sustains over time. Including multiple time points for one study would inflate the influence of the study when summarizing the evidence; this may also cause problems as the length of different interventions in one setting may vary greatly based on the final followup lengths.

For school-based studies, we reduced the requirement for length of followup to 6 months (from 1 year) considering the usual length of school years. However, 6 months may be short to observe an intervention’s effect on weight outcomes. It may be desirable to conduct in depth analysis to compare the findings from small, short-term (e.g., 6 months) studies with those from large, well-designed RCTs. However, we are limited by the scope of this review, the large heterogeneity across studies and small number of comparable studies. Some studies did not report the original study goals and some studies did not target obesity, that is, they targeted cardiovascular risks. These studies were included in this review because they had diet and physical activity interventions and reported body weight-related outcomes. Since these studies might differ from those that target childhood obesity prevention, they add heterogeneity to the study pool and yet provide valuable information on childhood obesity prevention.

We attempted to identify studies reported in languages other than English, but none of those met our inclusion criteria. As a result, one should exercise caution when generalizing findings from this review to non-English speaking populations.

## **Limitations of the Evidence Base**

There are also limitations with the evidence base. There are many differences across studies in term of countries, settings (e.g., school vs. home), design (e.g., RCTs versus non-RCTs), sample size, sample characteristics (e.g., all white versus mixed race/ethnicity), specific

intervention approaches (e.g., nutrition seminars vs. change in school café menus), primary measures that assess intervention effects (e.g., BMI vs. prevalence of obesity), length of followup, and statistical analysis approaches (e.g. F-tests vs. multi-level models). Such variability made it difficult to conduct meta-analyses for most of the various intervention studies we examined. As a result, we could only conduct meta-analysis for select outcomes (mainly BMI or BMI Z score) for KQ 1, and included only a small number of intervention studies in our pooled results.

Moreover, the preponderance of studies conducted in the school setting limits the generalizability of these results to other settings, especially for primary care and childcare.

Few studies reported standard errors or confidence intervals for the weight-related outcomes. In our analysis, we graded studies that did not report measures of variability as imprecise for the body of evidence. In some instances, the studies did not report a mean difference or point estimate and just stated that there was no significant difference in weight change between the groups. This led us to grade the strength of evidence insufficient or low and prevented us from quantitatively pooling results.

Except for the school-based interventions, the strength of evidence was generally low or insufficient for the interventions in other settings. These grades were a result of how we assessed the study quality and strength of evidence (detailed in the methods section). Common reasons for low or insufficient rates were inconsistent findings, a limited number of studies, the lack of blinding, and not accounting for losses to followup.

Since obesity interventions focus on lifestyle modifications, it is difficult to effectively blind participants from knowing whether they are in the intervention or control group. Therefore, we considered blinding to be most essential at the point of group assignment to minimize selection bias, rather than requiring blinding to sustain throughout the intervention phase. This is a reasonable modification and more applicable to this review, but it does allow for reporting bias. For example, participants in the intervention groups who failed to maintain weight and were aware of their group assignment might have refused re-examination, which would result in differential drop-out. The studies we reviewed usually did not report this. Few of the studies reported blinding of outcome assessors, which was likely difficult to implement in these studies.

The measurement of some outcomes, such as physical activity is controversial. There are no consistent standards on how to measure physical activity, especially spontaneous activity. To address this challenge, we formed an ordered list of physical activities, with input from other experts, to guide us in grading the strength of evidence. We made similar lists for weight and other diet-related outcomes.

Weight-related outcomes and statistical methods studies used to evaluate intervention effects were also heterogenous. We used BMI, or related measures such as BMI z-score, BMI percentile, and prevalence of overweight and/or obesity based on BMI cut points as the primary outcome measures. However, BMI is an indirect measure of adiposity and thus has its limitations; it is also not an ideal indicator for cardiometabolic risks. In addition, studies used different BMI cut points to define overweight and obesity. Further, some studies did not even report BMI, making cross-study comparisons difficult.

Lack of reporting some important information, such as process evaluation and program costs, program adherence/fidelity, and adaptations to the local context hinder our exploration in understanding the program effects.



## **Future Research Needs**

Many questions remain unanswered. We have identified a number of evidence gaps, many of which may warrant future research. Many of these are also supported by other reviews.<sup>192,207</sup>

### **1. Intervention Studies Conducted in Nonschool Settings**

The literature is sparse in interventions that take place in settings other than schools. This is identified by our review as well as by others.<sup>192,207</sup> The field needs more studies that test environment- and policy-based interventions. Although environment is a critical area for obesity prevention,<sup>192</sup> very few studies have tested such interventions.<sup>207</sup> In addition, there is scant evidence on the impact of regional or national policies on childhood obesity prevention, including agriculture policies and regulations on food retailing and distributions.<sup>192,207</sup>

Very few studies took place in clinical settings such as primary care. Primary health care providers could play an important role in childhood obesity prevention and treatment by providing healthful eating and exercise guidelines, and regularly monitoring body weight.

### **2. Innovative Study Design and Intervention Approaches**

Innovative interventions could help better target levers for behavioral changes. For example, increasingly, young people in the U.S. and worldwide are using social media, and thus it may be effective to use these modalities to reach these children and adolescents. Using well-developed behavioral theories when designing interventions will help researchers increase study success. For example, only a few studies used social marketing to deliver messages on nutrition, physical activity, and health. Studies can integrate this approach with other intervention components to promote desirable lifestyle changes. Consumer health informatics such as internet and smart phones provide promise for health promotion programs like obesity prevention. However, only six studies used consumer health informatics and only one reported significantly reduced obesity risk.

### **3. Systems Science Guided Intervention Studies**

Obesity in children is the result of a complex mix of biological, behavioral, social, economic, and environmental factors. Thus, the effective and sustainable prevention of obesity in children may have to target many factors, which calls for a systems approach in study design, implementation, and evaluation, that take into account multiple risk factors and the complex interactions and feedback loops among them.<sup>208</sup> To fill in the gaps, researchers first need to understand the contexts and challenges associated with implementing prevention programs in different settings. For example, to conduct a childhood obesity prevention program in a community setting, researchers often need to work with the local community and its key stakeholders, which requires considerable effort and resources. Such demand may help explain the small number of intervention studies conducted in nonschool settings. Researchers should report these contextual factors to help decisionmakers get a better idea of the applicability of a specific intervention program to their own community.

## **4. Studies That Test Potential Differential Effect of Interventions**

We need research that generates information about important sub-groups, such as populations stratified by gender, age, race/ethnicity, or socio-economic status, to test whether different groups may respond differently to the same intervention, and help tailor future interventions to maximize their benefits. To allow for such analysis we may need larger studies, which will be more costly. However, they are essential to provide valuable information for disseminating successful interventions. Such studies will test how different groups may respond to the same intervention differently, and can help tailor future interventions to maximize their benefits. Information about subgroups may lead to interventions that are better targeted, and could thus lead to a more efficient use of resources and better outcomes.

Most of the studies we reviewed did not report results by population subgroup. Subgroup analysis is necessary, as the effect size of a specific intervention may be small due to the heterogeneity of intervention effects among different subgroups. For example, an intervention may have worked in girls but not in boys. This may result in overall effectiveness being insignificant. Future research should include stratified analyses of sub-groups by gender, age, race/ethnicity, or socio-economic status. This will help test how different groups may respond to the same intervention, and help tailor future interventions to maximize their benefits. In addition, studies have found that obesity in older children is more predictive of obesity during adulthood than obesity in younger children.<sup>32</sup> We need more studies to find effective prevention strategies for obesity that occurs in late childhood and adolescence.

## **5. Studies With High Statistical Power**

We need more studies with large sample sizes and adequate length of followup, because most childhood obesity intervention programs are not intensive enough and only result in modest behavioral changes. This is also due to the fact that many factors can affect individuals' eating and physical activity.

## **6. Publication of Process Evaluation Results on Interventions**

The publication of process evaluations should be encouraged, especially those that attempt to compare multiple interventions. Such knowledge is important for translational research and dissemination. Very few of the studies we reviewed reported process evaluation, which would provide useful insights regarding why some studies might detect a desirable effect of the intervention, while others do not.

## **7. Application of Rigorous Analytic Approaches**

We need more rigorous analytic approaches to better analyze the repeated measures collected during the followup, to control for confounders remaining after randomization, and to test effect modification and heterogeneity in the treatment effect.

## **8. Obesity Prevention Research on Adolescents**

Obesity in adolescents has been found to be more predictive of obesity during adulthood than obesity in younger children.<sup>32</sup> We need more studies to find effective prevention strategies for obesity that occurs in late childhood and adolescence. This is an important stage of life when

young people are exposed to various social and environmental factors that establish lifelong life habits.

## **Conclusions**

A large number of childhood obesity intervention studies have taken place in high-income countries over the past three decades. They predominately occurred in school settings and mostly in the U.S. Many of the school-based studies also included intervention components implemented in other settings, such as the home and community. Overall, there is moderate-to-high strength of evidence to support that diet and/or physical activity interventions that are implemented in schools help prevent excessive weight gain or reduce the prevalence of overweight and obesity. The added value of school-based interventions, including involvements at home or in the community or the implementation of policies directed at the environment to improve dietary intake or increase physical activity, is generally positive. However, the effectiveness of interventions primarily implemented at home, in primary care, and child-care settings or those using consumer health informatics approaches is largely unknown. We need more research to test interventions conducted in settings other than schools, and to test the impact of policy changes and environmental changes. We should encourage research that tests innovative interventions taking advantage of new technologies, research theories, and methodologies (including systems science). Future research also needs to examine which types of interventions may be more effective and sustainable, and whether subgroups might respond to the same intervention differently.

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## Appendix A. List of Acronyms

AHRQ	Agency for Healthcare Research and Quality
API	Asian Pacific Islanders
BMC	Bone Mineral Content
BMD	Bone Mineral Density
BMI	Body Mass Index
BNH	Black Non-Hispanic
BP	Blood Pressure
CDC	Centers for Disease Control
CER	Comparative Effectiveness Review
CNMI	Commonwealth of the Northern Marina Islands
CVD	Cardiovascular Disease
DXA	Dual-Emission X-Ray Absorptiometry
Edu	Education
HDL	High-Density Lipids
HRQOL	Health-Related Quality Of Life
KQ	Key Question
LDL	Low-Density Lipids
Maint	Maintenance
MeSH	Medical Subject Headings
N	No
NR	Not Relevant
oth	Other
Phy	Physical or Environmental
PICOTS	Population/Intervention/Comparison/Outcome/Timeframe/Setting
PRISMA	Preferred Reporting Items For Systematic Reviews And Meta-Analyses
RCT	Randomized Controlled Trials
SD	Standard Deviation
SES	Social-Economic Status
SM	Self-Management
TEP	Technical Expert Panel
WHO	World Health Organization
WNH	White Non-Hispanic
Y	Yes

## Appendix B. Detailed Search Strategies

PubMed

Search (("body weight"[mh] OR "body weight"[tiab] OR "normal weight"[tiab] OR "healthy weight"[tiab] OR obese[tiab] OR obesity[tiab] OR overweight[tiab] OR "over weight"[tiab] OR "body mass index"[mh] OR "body mass index"[tiab] OR BMI[tiab] OR "Waist circumference"[mh] OR "Waist circumference"[tiab] OR "skinfold thickness"[mh] OR "skinfold thickness"[tiab] OR ("body fat"[tiab] AND percent*[tiab]) OR "body composition"[mh] OR "body composition"[tiab] OR Adiposity[tiab]) AND (maintenance[tiab] OR maintain[tiab] OR management[tiab] OR manage[tiab] OR ("weight gain"[tiab] AND (prevent*[tiab] OR reduce[tiab] OR reduction[tiab])) OR Prevention[tiab] OR Intervention[tiab] OR Preventative[tiab] OR Promote[tiab] OR Promotion[tiab] OR weight control[tiab] OR control[tiab]) AND ("educational setting"[tiab] OR Academic[tiab] OR Kindergarten[tiab] OR School[tiab] OR Schools[tiab] OR Schools[mh] OR "after-school"[tiab] AND "after school"[tiab] OR Caregiver[tiab] OR Caregivers[mh] OR Caregivers[tiab] OR Cooking[mh] OR Cooking[tiab] OR Family[mh] OR Family[tiab] OR Families[tiab] AND Father[tiab] OR Fathers[tiab] OR Home[tiab] OR House[tiab] OR Meal[tiab] OR Meals[tiab] OR Mother[tiab] OR Mothers[tiab] OR Parent[tiab] OR Parents[tiab] OR Parental[tiab] OR Parenting[tiab] OR Purchasing[tiab] OR Shopping[tiab] OR "adolescent medicine"[mh] OR "family physician"[tiab] OR "physicians, family"[mh] OR "primary care"[tiab] OR "primary health care"[mh] OR "primary health care"[tiab] OR Clinic[tiab] OR Clinical[tiab] OR Clinics[tiab] OR Medical[tiab] OR Medicine[tiab] OR Office[tiab] OR Pediatrician[tiab] OR Paediatrician[tiab] OR Pediatricians[tiab] OR Pediatrics[mh] OR "after care"[tiab] OR "child day care centers"[mh] OR "day care"[tiab] OR "preschool"[tiab] OR "pre-school"[tiab] OR "boy scout"[tiab] OR "boy scouts"[tiab] OR "Girl scouts"[tiab] OR Campfire[tiab] OR Church[tiab] OR Community[tiab] OR Communities[tiab] OR Faith[tiab] OR Garden[tiab] OR Gardening[mh] OR Mosque[tiab] OR Neighborhood[tiab] OR Neighborhoods[tiab] OR Recreation[mh] OR Recreation[tiab] OR Synagogue[tiab] OR YMCA[tiab] OR YWCA[tiab] OR "calorie information"[tiab] OR "calorie labeling"[tiab] OR "food label"[tiab] OR "food labeling"[mh] OR "food labeling"[tiab] OR "health Policy"[mh] OR "policy"[tiab] OR "income inequality"[tiab] OR "social-ecological"[tiab] OR "socioeconomic factors"[mh] OR campaign[tiab] OR Environment[mh] OR Environment[tiab] OR Environmental[tiab] OR Infrastructure[tiab] OR Tax*[tiab] OR taxes[mh] OR "Consumer Health Information"[Mesh] OR "Informatics"[Mesh] OR "internet"[MeSH Terms] OR "Medical Informatics Applications"[Mesh] OR "medical informatics"[mh] OR "Support systems"[tiab] OR "computer communication networks"[mh] OR "electronic mail"[mh] OR "electronic media"[tiab] OR informatics[tiab] OR Internet[tiab] OR Facebook[tiab] OR Cell phone[tiab] OR Telephone[tiab] OR telemedicine[mh] OR regulation[tiab])) NOT (Cure[tiab] OR Medication[tiab] OR Drug[tiab] OR Drugs[tiab] OR Pharmacy[tiab] OR Pharmaceutical[tiab] OR Surgical[tiab] OR Surgery[tiab] OR Orlistat[Supplementary Concept] OR Orlistat[tiab] OR Phentermine[mh] OR Phentermine[tiab] OR Sibutramine[Supplementary Concept] OR Sibutramine[tiab] OR "bariatric surgery"[mh]) NOT ((adult[tiab] OR adults[tiab] OR men[mh] OR men[tiab] OR women[mh] OR women[tiab] OR infant[mh] OR infant[tiab]) NOT (child[mh] OR child[tiab] OR children[tiab] OR adolescent[mh] OR adolescent[tiab] OR "teen-age"[tiab] OR pediatric[tiab] OR paediatric[tiab])) NOT (animal[mh] NOT human[mh]))	16997
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<p>school OR schools OR caregiver OR caregivers OR 'cooking'/exp OR cooking OR 'family'/exp OR family OR families OR father OR fathers OR home OR house OR meal OR meals OR mother OR mothers OR parent OR parents OR parental OR parenting OR purchasing OR shopping OR 'adolescent medicine' OR 'family physician' OR 'primary health care'/exp OR 'primary health care' OR 'primary care' OR clinic OR clinical OR clinics OR medical OR medicine OR office OR pediatrics OR pediatrician OR paediatrician OR pediatricians OR 'day care' OR 'after care' OR preschool OR 'pre-school' OR 'boy scout' OR 'boy scouts' OR 'girl scout' OR 'girl scouts' OR campfire OR church OR community OR communities OR faith OR garden OR 'gardening'/exp OR mosque OR neighborhood OR neighborhoods OR recreation OR synagogue OR ymca OR ywca OR 'calorie information' OR 'calorie labeling' OR 'food label' OR 'food labeling' OR policy OR 'income inequality' OR 'social-ecological' OR 'socioeconomic factors' OR 'socioeconomics'/exp OR campaign OR environment OR environmental OR infrastructure OR tax* OR 'consumer health information'/exp OR informatics OR internet OR 'support systems' OR 'e-mail' OR 'electronic mail' OR facebook OR 'cell phone' OR cellphone OR telephone OR telemedicine OR regulation OR academic OR kindergarten AND (control OR maintenance OR maintain OR management OR manage OR ('weight gain' AND (prevent* OR reduce OR reduction)) OR prevention OR preventative OR promote OR intervention OR promotion) AND ('body weight' OR 'normal weight' OR 'healthy weight' OR obese OR obesity OR overweight OR 'body mass'/exp OR 'body mass index' OR bmi OR 'waist circumference' OR 'skinfold thickness' OR ('body fat' AND percent) OR 'body composition'/exp OR 'body composition' OR adiposity) NOT (orlistat OR tetrahydropyridine OR phentermine OR sibutramine OR 'bariatric surgery'/exp OR cure OR medication OR drug OR drugs OR pharmacy OR pharmaceutical OR surgery OR surgical) AND ([article]/lim OR [article in press]/lim OR [conference abstract]/lim OR [conference paper]/lim OR [conference review]/lim OR [erratum]/lim OR [review]/lim) AND ([preschool]/lim OR [school]/lim OR [child]/lim OR [adolescent]/lim) AND [humans]/lim AND [embase]/lim AND [&lt;1966-2010]/py OR (school OR schools OR caregiver OR caregivers OR 'cooking'/exp OR cooking OR 'family'/exp OR family OR families OR father OR fathers OR home OR house OR meal OR meals OR mother OR mothers OR parent OR parents OR parental OR parenting OR purchasing OR shopping OR 'adolescent medicine' OR 'family physician' OR 'primary health care'/exp OR 'primary health care' OR 'primary care' OR clinic OR clinical OR clinics OR medical OR medicine OR office OR pediatrics OR pediatrician OR paediatrician OR pediatricians OR 'day care' OR 'after care' OR preschool OR 'pre-school' OR 'boy scout' OR 'boy scouts' OR 'girl scout' OR 'girl scouts' OR campfire OR church OR community OR communities OR faith OR garden OR 'gardening'/exp OR mosque OR neighborhood OR neighborhoods OR recreation OR synagogue OR ymca OR ywca OR 'calorie information' OR 'calorie labeling' OR 'food label' OR 'food labeling' OR policy OR 'income inequality' OR 'social-ecological' OR 'socioeconomic factors' OR 'socioeconomics'/exp OR campaign OR environment OR environmental OR infrastructure OR tax* OR 'consumer health information'/exp OR informatics OR internet OR 'support systems' OR 'e-mail' OR 'electronic mail' OR facebook OR 'cell phone' OR cellphone OR telephone OR telemedicine OR regulation OR academic OR kindergarten AND (control OR maintenance OR maintain OR management OR manage OR ('weight gain' AND (prevent* OR reduce OR reduction)) OR prevention OR preventative OR promote OR intervention OR promotion) AND ('body weight' OR 'normal weight' OR 'healthy weight' OR obese OR obesity OR overweight OR 'body mass'/exp OR 'body mass index' OR bmi OR 'waist circumference' OR 'skinfold thickness' OR ('body fat' AND percent) OR 'body composition'/exp OR 'body composition' OR adiposity) NOT (orlistat OR tetrahydropyridine OR phentermine OR sibutramine OR 'bariatric surgery'/exp OR cure OR medication OR drug OR drugs OR pharmacy OR pharmaceutical OR surgery OR surgical) NOT (adult OR adults OR men OR women OR infant NOT (child OR children OR adolescent OR adolescents OR 'teen age' OR 'teen-age' OR 'teenage' OR pediatric OR paediatric)) NOT (animal NOT human) AND ([article]/lim OR [article in press]/lim OR [conference abstract]/lim OR [conference paper]/lim OR [conference review]/lim OR [erratum]/lim) AND [embase]/lim AND [2011-2012]/py)</p>	7521
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<p>#1 "educational setting":ti,ab,kw 20 edit delete</p> <p>#2 (academic):ti,ab,kw 3157 edit delete</p> <p>#3 (kindergarten):ti,ab,kw 193 edit delete</p> <p>#4 (shcool):ti,ab,kw 2 edit delete</p> <p>#5 MeSH descriptor <b>Schools</b> explode tree 1 761 edit delete</p> <p>#6 "after-school":ti,ab,kw 83 edit delete</p> <p>#7 "after school":ti,ab,kw 83 edit delete</p> <p>#8 (caregiver):ti,ab,kw 1069 edit delete</p> <p>#9 (caregivers):ti,ab,kw 1829 edit delete</p> <p>#10 (cooking):ti,ab,kw 535 edit delete</p> <p>#11 MeSH descriptor <b>Family</b>, this term only 828 edit delete</p> <p>#12 (family):ti,ab,kw 11572 edit delete</p> <p>#13 (father):ti,ab,kw 373 edit delete</p> <p>#14 (home):ti,ab,kw 12623 edit delete</p> <p>#15 (house):ti,ab,kw 1967 edit delete</p> <p>#16 (meal):ti,ab,kw 6951 edit delete</p> <p>#17 (mother):ti,ab,kw 5384 edit delete</p> <p>#18 (parent):ti,ab,kw 7453 edit delete</p> <p>#19 (parental):ti,ab,kw 1954 edit delete</p> <p>#20 (purchasing):ti,ab,kw 387 edit delete</p> <p>#21 (shopping):ti,ab,kw 137 edit delete</p> <p>#22 "adolescent medicine":ti,ab,kw 26 edit delete</p> <p>#23 "family physician":ti,ab,kw 128 edit delete</p> <p>#24 "primary health care":ti,ab,kw 2876 edit delete</p> <p>#25 (clinic):ti,ab,kw 12937 edit delete</p> <p>#26 (clinical):ti,ab,kw 215567 edit delete</p> <p>#27 (medical):ti,ab,kw 34560 edit delete</p> <p>#28 (medicine):ti,ab,kw 14448 edit delete</p> <p>#29 (office):ti,ab,kw 2614 edit delete</p> <p>#30 MeSH descriptor <b>Pediatrics</b>, this term only 414 edit delete</p> <p>#31 (pediatrician):ti,ab,kw 387 edit delete</p> <p>#32 "after care":ti,ab,kw 60 edit delete</p> <p>#33 "day care":ti,ab,kw 749 edit delete</p> <p>#34 (preschool):ti,ab,kw 23599 edit delete</p> <p>#35 "pre-school":ti,ab,kw 245 edit delete</p> <p>#36 "boy scout":ti,ab,kw 5 edit delete</p> <p>#37 "boy scouts":ti,ab,kw 4 edit delete</p> <p>#38 "girl scout":ti,ab,kw 6 edit delete</p> <p>#39 "girl scouts":ti,ab,kw 5 edit delete</p> <p>#40 (church):ti,ab,kw 118 edit delete</p> <p>#41 (community):ti,ab,kw 13442 edit delete</p> <p>#42 (faith):ti,ab,kw 65 edit delete</p> <p>#43 (garden):ti,ab,kw 67 edit delete</p> <p>#44 (mosque):ti,ab,kw 1 edit delete</p> <p>#45 (neighborhood):ti,ab,kw 319 edit delete</p> <p>#46 MeSH descriptor <b>Recreation</b> explode all trees 7703 edit delete</p> <p>#47 (recreation):ti,ab,kw 207 edit delete</p> <p>#48 (YMCA):ti,ab,kw 13 edit delete</p> <p>#49 "food labeling":ti,ab,kw 29 edit delete</p> <p>#50 "food label":ti,ab,kw 10 edit delete</p> <p>#51 MeSH descriptor <b>Health Policy</b> explode tree 3 402 edit delete</p> <p>#52 (policy):ti,ab,kw 3400 edit delete</p>	2461
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<p> #53 "social-ecological":ti,ab,kw 20 edit delete  #54 MeSH descriptor <b>Socioeconomic Factors</b> explode tree 2 5321 edit delete  #55 (campaign):ti,ab,kw 641 edit delete  #56 (environment):ti,ab,kw 5030 edit delete  #57 (environmental):ti,ab,kw 2876 edit delete  #58 (infrastructure):ti,ab,kw 223 edit delete  #59 (tax*):ti,ab,kw 1658 edit delete  #60 MeSH descriptor <b>Consumer Health Information</b> explode tree 1 76 edit delete  #61 (informatics):ti,ab,kw 176 edit delete  #62 (internet):ti,ab,kw 2492 edit delete  #63 MeSH descriptor <b>Medical Informatics Applications</b> explode all trees 7344 edit delete  #64 "support systems":ti,ab,kw 328 edit delete  #65 MeSH descriptor <b>Computer Communication Networks</b> explode all trees 1248 edit delete  #66 "electronic mail":ti,ab,kw 171 edit delete  #67 "e-mail":ti,ab,kw 310 edit delete  #68 "electronic media":ti,ab,kw 16 edit delete  #69 "cell phone":ti,ab,kw 46 edit delete  #70 (telephone):ti,ab,kw 4811 edit delete  #71 (telemedicine):ti,ab,kw 830 edit delete  #72 (regulation):ti,ab,kw 6616 edit delete  #73 (  #1 OR  #2 OR  #3 OR  #4 OR  #5 OR  #6 OR  #7 OR  #8 OR  #9 OR  #10 OR  #11 OR  #12 OR  #13 OR  #14 OR  #15 OR  #16 OR  #17 OR  #18 OR  #19 OR  #20 OR  #21 OR  #22 OR  #23 OR  #24 OR  #25 OR  #26 OR  #27 OR  #28 OR  #29 OR  #30 OR  #31 OR  #32 OR  #33 OR </p>	
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<p> #34 OR  #35 OR  #36 OR  #37 OR  #38 OR  #39 OR  #40 OR  #41 OR  #42 OR  #43 OR  #44 OR  #45 OR  #46 OR  #47 OR  #48 OR  #49 OR  #50 OR  #51 OR  #52 OR  #53 OR  #54 OR  #55 OR  #56 OR  #57 OR  #58 OR  #59 OR  #60 OR  #61 OR  #62 OR  #63 OR  #64 OR  #65 OR  #66 OR  #67 OR  #68 OR  #69 OR  #70 OR  #71 OR  #72) 314499 edit delete  #74 (maintenance):ti,ab,kw or (maintain):ti,ab,kw or (management):ti,ab,kw or  (manage):ti,ab,kw or (prevention):ti,ab,kw 143775 edit delete  #75 (promote) or (promotion):ti or (control):au or (intervention):pt or (preventative):kw  10501 edit delete  #76 (weight gain):ti,ab,kw 4659 edit delete  #77 (prevent*):ti,ab,kw or (reduce):ti,ab,kw or (reduction):au 175751 edit delete  #78 (  #76 AND  #77) 1688 edit delete  #79 (  #74 OR  #75 OR  #78) 151220 edit delete  #80 (  #73 AND  #79) 81196 edit delete  #81 "body weight":ti,ab,kw or "normal weight":ti,ab,kw or "healthy weight":ti,ab,kw or </p>	
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(obesity):ti,ab,kw or (obese):ti,ab,kw 21417 edit delete #82 (overweight):ti,ab,kw or "over weight":ti,ab,kw or "body mass index":ti,ab,kw or (BMI):ti,ab,kw or "waist circumference":ti,ab,kw 12787 edit delete #83 "skinfold thickness":ti,ab,kw or (adiposity):ti,ab,kw or "body composition":ti,ab,kw 4045 edit delete #84 "body fat":ti,ab,kw and (percent*):ti,ab,kw 734 edit delete #85 MeSH descriptor <b>Body Mass Index</b> explode tree 3 4762 edit delete #86 ( #81 OR #82 OR #83 OR #84 OR #85) 29578 edit delete #87 ( #73 AND #79 AND #86) 5113 edit delete #88 (cure):ti,ab,kw or (medication):ti,ab,kw or (drug):ti,ab,kw or (pharmacy):ti,ab,kw or (pharmaceutical):ti,ab,kw 296948 edit delete #89 (surgical):ti,ab,kw or (surgery):ti,ab,kw or (Orlistat):ti,ab,kw or (Phentermine):ti,ab,kw and (Sibutramine):ti,ab,kw in Cochrane Reviews 1331 edit delete #90 ( #88 OR #89) 351275 edit delete #91 MeSH descriptor <b>Phentermine</b> , this term only 46 edit delete #92 MeSH descriptor <b>Bariatric Surgery</b> explode tree 1 544 edit delete #93 ( #90 OR #91) 351278 edit delete #94 ( #90 OR #91 OR #92) 351329 edit delete #95 ( #87 AND NOT #94) 2761 edit delete	
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S338	S333 NOT S337
S337	S334 or S335 or S336
S336	TX cure OR TX medication OR TX drug OR TX drugs OR TX pharmacy OR TX pharmaceutical OR TX surgery OR TX surgical
S335	TX orlistat
S334	TX sibutramine
S333	S281 and S332
S332	S282 or S283 or S284 or S285 or S286 or S287 or S288 or S289 or S290 or S291 or S292 or S293 or S294 or S295 or S296 or S297 or S298 or S299 or S300 or S301 or S302 or S303 or S304 or S305 or S306 or S307 or S308 or S309 or S310 or S311 or S312 or S313 or S314 or S315 or S316 or S317 or S318 or S319 or S320 or S321 or S322 or S323 or S324 or S325 or S326 or S327 or S328 or S329 or S330 or S331
S331	TX internet OR TX facebook OR TX "cell phone" OR TX regulation
S330	TX "support systems"
S329	TX "electronic media"
S328	TX telemedicine
S327	TX "consumer health information"
S326	TX informatics
S325	TX "Computer communication networks"

S324	TX "electronic mail" OR TX "e-mail"
S332	S282 or S283 or S284 or S285 or S286 or S287 or S288 or S289 or S290 or S291 or S292 or S293 or S294 or S295 or S296 or S297 or S298 or S299 or S300 or S301 or S302 or S303 or S304 or S305 or S306 or S307 or S308 or S309 or S310 or S311 or S312 or S313 or S314 or S315 or S316 or S317 or S318 or S319 or S320 or S321 or S322 or S323 or S324 or S325 or S326 or S327 or S328 or S329 or S330 or S331
S331	TX internet OR TX facebook OR TX "cell phone" OR TX regulation
S330	TX "support systems"
S33	TX cooking
S329	TX "electronic media"
S328	TX telemedicine
S327	TX "consumer health information"
S326	TX informatics
S325	TX "Computer communication networks"
S324	TX "electronic mail" OR TX "e-mail"
S323	TX tax*
S322	TX infrastructure
S321	TX environmental
S320	TX campaign
S319	TX environment
S318	TX "income inequality"
S317	TX "social-ecological"
S316	TX socioeconomic
S315	TX policy
S314	TX clinic OR TX clinical OR TX clinics OR TX medical OR TX medicine OR TX office
S313	TX "primary care"
S312	TX "Primary Health Care"
S311	TX "adolescent medicine"
S310	TX "family physician" OR TX pediatrician
S309	(MM "Physicians, Family") OR (MM "Pediatricians")
S308	TX garden OR TX gardening
S307	TX faith
S306	TX community OR TX communities OR TX neighborhood OR TX neighborhoods
S305	TX church OR TX Synagogue OR TX Mosque
S304	TX recreation
S303	TX ywca
S302	TX ymca
S301	TX campfire
S300	TX "girl scouts"
S299	TX "girl scout"
S298	TX "boy scouts"
S297	TX "boy scout"
S296	TX "food label"
S295	TX "food labeling"
S294	TX meal OR TX meals OR TX purchasing OR TX shopping OR TX calorie
S293	TX house OR TX home
S292	TX preschool OR TX "pre-school"
S291	TX "day care"
S290	TX father OR TX fathers OR TX mother OR TX mothers OR TX parent OR TX parents OR TX parental OR TX parenting
S289	TX "educational setting" OR TX academic OR TX kindergarten OR TX "after-school" OR TX "after school" OR TX families
S288	TX school
S287	TX caregivers
S286	TX "care giver"
S285	TX caregiver
S284	TX cooking
S283	TX schools
S282	TX family



S281	S275 and S280
S280	S276 or S279
S279	S277 and S278
S278	TX "weight gain"
S277	TX prevent* OR TX reduce OR TX reduction
S276	TX maintenance OR TX maintain OR TX manage OR TX prevention OR TX intervention OR TX preventative OR TX promote OR TX promotion OR TX control
S275	S264 or S265 or S266 or S267 or S268 or S269 or S270 or S271 or S272 or S273 or S274
S274	TX "body fat" AND TX percent*
S273	TX "Waist circumference" OR TX adiposity
S272	TX obese OR TX obesity OR TX overweight OR TX "over weight"
S271	TX "normal weight" OR TX "healthy weight"
S270	TX "body composition"
S27	TX "weight gain"
S269	"skinfold thickness"
S268	TX obese
S267	TX obesity
S266	TX BMI
S265	TX "body mass index"
S264	TX "body weight"
S263	S252 or S253 or S254 or S255 or S256 or S257 or S258 or S259 or S260 or S261 or S262
S262	TX "body fat" AND TX percent*
S261	TX "Waist circumference" OR TX adiposity
S260	TX obese OR TX obesity OR TX overweight OR TX "over weight"
S26	TX prevent* OR TX reduce OR TX reduction
S259	TX "normal weight" OR TX "healthy weight"
S258	TX "body composition"
S257	"skinfold thickness"
S256	TX obese
S255	TX obesity
S254	TX BMI
S253	TX "body mass index"
S252	TX "body weight"
S251	S199 and S250
S250	S200 or S201 or S202 or S203 or S204 or S205 or S206 or S207 or S208 or S209 or S210 or S211 or S212 or S213 or S214 or S215 or S216 or S217 or S218 or S219 or S220 or S221 or S222 or S223 or S224 or S225 or S226 or S227 or S228 or S229 or S230 or S231 or S232 or S233 or S234 or S235 or S236 or S237 or S238 or S239 or S240 or S241 or S242 or S243 or S244 or S245 or S246 or S247 or S248 or S249
S249	TX internet OR TX facebook OR TX "cell phone" OR TX regulation
S248	TX "support systems"
S247	TX "electronic media"
S246	TX telemedicine
S245	TX "consumer health information"
S244	TX informatics
S243	TX "Computer communication networks"
S242	TX "electronic mail" OR TX "e-mail"
S241	TX tax*
S240	TX infrastructure
S24	S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20 or S21 or S22 or S23
S239	TX environmental
S238	TX campaign
S237	TX environment
S236	TX "income inequality"
S235	TX "social-ecological"
S234	TX socioeconomic
S233	TX policy
S232	TX clinic OR TX clinical OR TX clinics OR TX medical OR TX medicine OR TX office
S231	TX "primary care"

S230	TX "Primary Health Care"
S229	TX "adolescent medicine"
S228	TX "family physician" OR TX pediatrician
S227	(MM "Physicians, Family") OR (MM "Pediatricians")
S226	TX garden OR TX gardening
S225	TX faith
S224	TX community OR TX communities OR TX neighborhood OR TX neighborhoods
S223	TX church OR TX Synagogue OR TX Mosque
S222	TX recreation
S221	TX ywca
S220	TX ymca
S219	TX campfire
S218	TX "girl scouts"
S217	TX "girl scout"
S216	TX "boy scouts"
S215	TX "boy scout"
S214	TX "food label"
S213	TX "food labeling"
S212	TX meal OR TX meals OR TX purchasing OR TX shopping OR TX calorie
S211	TX house OR TX home
S210	TX preschool OR TX "pre-school"
S209	TX "day care"
S208	TX father OR TX fathers OR TX mother OR TX mothers OR TX parent OR TX parents OR TX parental OR TX parenting
S207	TX "educational setting" OR TX academic OR TX kindergarten OR TX "after-school" OR TX "after school" OR TX families
S206	TX school
S205	TX caregivers
S204	TX "care giver"
S203	TX caregiver
S202	TX cooking
S201	TX schools
S200	TX family
S199	S193 and S198
S198	S194 or S197
S197	S195 and S196
S196	TX "weight gain"
S195	TX prevent* OR TX reduce OR TX reduction
S194	TX maintenance OR TX maintain OR TX manage OR TX prevention OR TX intervention OR TX preventative OR TX promote OR TX promotion OR TX control
S193	S182 or S183 or S184 or S185 or S186 or S187 or S188 or S189 or S190 or S191 or S192
S192	TX "body fat" AND TX percent*
S191	TX "Waist circumference" OR TX adiposity
S190	TX obese OR TX obesity OR TX overweight OR TX "over weight"
S189	TX "normal weight" OR TX "healthy weight"
S188	TX "body composition"
S187	"skinfold thickness"
S186	TX obese
S185	TX obesity
S184	TX BMI
S183	TX "body mass index"
S182	TX "body weight"
S181	S170 or S171 or S172 or S173 or S174 or S175 or S176 or S177 or S178 or S179 or S180
S180	TX "body fat" AND TX percent*
S179	TX "Waist circumference" OR TX adiposity
S178	TX obese OR TX obesity OR TX overweight OR TX "over weight"
S177	TX "normal weight" OR TX "healthy weight"
S176	TX "body composition"
S175	"skinfold thickness"

S174	TX obese
S173	TX obesity
S172	TX BMI
S171	TX "body mass index"
S170	TX "body weight"
S169	S164 NOT S168
S168	S165 or S166 or S167
S167	TX cure OR TX medication OR TX drug OR TX drugs OR TX pharmacy OR TX pharmaceutical OR TX surgery OR TX surgical
S166	TX orlistat
S165	TX sibutramine
S164	S112 and S163
S163	S113 or S114 or S115 or S116 or S117 or S118 or S119 or S120 or S121 or S122 or S123 or S124 or S125 or S126 or S127 or S128 or S129 or S130 or S131 or S132 or S133 or S134 or S135 or S136 or S137 or S138 or S139 or S140 or S141 or S142 or S143 or S144 or S145 or S146 or S147 or S148 or S149 or S150 or S151 or S152 or S153 or S154 or S155 or S156 or S157 or S158 or S159 or S160 or S161 or S162
S162	TX internet OR TX facebook OR TX "cell phone" OR TX regulation
S161	TX "support systems"
S160	TX "electronic media"
S159	TX telemedicine
S158	TX "consumer health information"
S157	TX informatics
S156	TX "Computer communication networks"
S155	TX "electronic mail" OR TX "e-mail"
S154	TX tax*
S153	TX infrastructure
S152	TX environmental
S151	TX campaign
S150	TX environment
S149	TX "income inequality"
S148	TX "social-ecological"
S147	TX socioeconomic
S146	TX policy
S145	TX clinic OR TX clinical OR TX clinics OR TX medical OR TX medicine OR TX office
S144	TX "primary care"
S143	TX "Primary Health Care"
S142	TX "adolescent medicine"
S141	TX "family physician" OR TX pediatrician
S140	(MM "Physicians, Family") OR (MM "Pediatricians")
S139	TX garden OR TX gardening
S138	TX faith
S137	TX community OR TX communities OR TX neighborhood OR TX neighborhoods
S136	TX church OR TX Synagogue OR TX Mosque
S135	TX recreation
S134	TX ywca
S133	TX ymca
S132	TX campfire
S131	TX "girl scouts"
S130	TX "girl scout"
S129	TX "boy scouts"
S128	TX "boy scout"
S127	TX "food label"
S126	TX "food labeling"
S125	TX meal OR TX meals OR TX purchasing OR TX shopping OR TX calorie
S124	TX house OR TX home
S123	TX preschool OR TX "pre-school"
S122	TX "day care"
S121	TX father OR TX fathers OR TX mother OR TX mothers OR TX parent OR TX parents OR TX parental

	OR TX parenting
S120	TX "educational setting" OR TX academic OR TX kindergarten OR TX "after-school" OR TX "after school" OR TX families
S119	TX school
S118	TX caregivers
S117	TX "care giver"
S116	TX caregiver
S115	TX cooking
S114	TX schools
S113	TX family
S112	S106 and S111
S111	S107 or S110
S110	S108 and S109
S109	TX "weight gain"
S108	TX prevent* OR TX reduce OR TX reduction
S107	TX maintenance OR TX maintain OR TX manage OR TX prevention OR TX intervention OR TX preventative OR TX promote OR TX promotion OR TX control
S106	S95 or S96 or S97 or S98 or S99 or S100 or S101 or S102 or S103 or S104 or S105
S105	TX "body fat" AND TX percent*
S104	TX "Waist circumference" OR TX adiposity
S103	TX obese OR TX obesity OR TX overweight OR TX "over weight"
S102	TX "normal weight" OR TX "healthy weight"
S101	TX "body composition"
S100	"skinfold thickness"
S99	TX obese
S98	TX obesity
S97	TX BMI
S96	TX "body mass index"
S95	TX "body weight"
S94	S83 or S84 or S85 or S86 or S87 or S88 or S89 or S90 or S91 or S92 or S93
S93	TX "body fat" AND TX percent*
S92	TX "Waist circumference" OR TX adiposity
S91	TX obese OR TX obesity OR TX overweight OR TX "over weight"
S90	TX "normal weight" OR TX "healthy weight"
S89	TX "body composition"
S88	"skinfold thickness"
S87	TX obese
S86	TX obesity
S85	TX BMI
S84	TX "body mass index"
S83	TX "body weight"
S82	S30 and S81
S81	S31 or S32 or S33 or S34 or S35 or S36 or S37 or S38 or S39 or S40 or S41 or S42 or S43 or S44 or S45 or S46 or S47 or S48 or S49 or S50 or S51 or S52 or S53 or S54 or S55 or S56 or S57 or S58 or S59 or S60 or S61 or S62 or S63 or S64 or S65 or S66 or S67 or S68 or S69 or S70 or S71 or S72 or S73 or S74 or S75 or S76 or S77 or S78 or S79 or S80
S80	TX internet OR TX facebook OR TX "cell phone" OR TX regulation
S79	TX "support systems"
S78	TX "electronic media"
S77	TX telemedicine
S76	TX "consumer health information"
S75	TX informatics
S74	TX "Computer communication networks"
S73	TX "electronic mail" OR TX "e-mail"
S72	TX tax*
S71	TX infrastructure
S70	TX environmental
S69	TX campaign
S68	TX environment

S67	TX "income inequality"
S66	TX "social-ecological"
S65	TX socioeconomic
S64	TX policy
S63	TX clinic OR TX clinical OR TX clinics OR TX medical OR TX medicine OR TX office
S62	TX "primary care"
S61	TX "Primary Health Care"
S60	TX "adolescent medicine"
S59	TX "family physician" OR TX pediatrician
S58	(MM "Physicians, Family") OR (MM "Pediatricians")
S57	TX garden OR TX gardening
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S52	TX ywca
S51	TX ymca
S50	TX campfire
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S46	TX "boy scout"
S45	TX "food label"
S44	TX "food labeling"
S43	TX meal OR TX meals OR TX purchasing OR TX shopping OR TX calorie
S42	TX house OR TX home
S41	TX preschool OR TX "pre-school"
S40	TX "day care"
S39	TX father OR TX fathers OR TX mother OR TX mothers OR TX parent OR TX parents OR TX parental OR TX parenting
S38	TX "educational setting" OR TX academic OR TX kindergarten OR TX "after-school" OR TX "after school" OR TX families
S37	TX school
S36	TX caregivers
S35	TX "care giver"
S34	TX caregiver
S33	TX cooking
S32	TX schools
S31	TX family
S30	S24 and S29
S29	S25 or S28
S28	S26 and S27
S27	TX "weight gain"
S26	TX prevent* OR TX reduce OR TX reduction
S25	TX maintenance OR TX maintain OR TX manage OR TX prevention OR TX intervention OR TX preventative OR TX promote OR TX promotion OR TX control
S24	S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20 or S21 or S22 or S23
S23	TX "body fat" AND TX percent*
S22	TX "Waist circumference" OR TX adiposity
S21	TX obese OR TX obesity OR TX overweight OR TX "over weight"
S20	TX "normal weight" OR TX "healthy weight"
S19	TX "body composition"
S18	"skinfold thickness"
S17	TX obese
S16	TX obesity
S15	TX BMI
S14	TX "body mass index"
S13	TX "body weight"
S12	S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11

S11	TX "body fat" AND TX percent*
S10	TX "Waist circumference" OR TX adiposity
S9	TX obese OR TX obesity OR TX overweight OR TX "over weight"
S8	TX "normal weight" OR TX "healthy weight"
S7	TX "body composition"
S6	"skinfold thickness"
S5	TX obese
S4	TX obesity
S3	TX BMI
S2	TX "body mass index"
S1	TX "body weight"

ClinicalTrials.gov

Clinicaltrials.gov

23July2012

Childhood AND obesity: 213

Childhood AND weight: 364

Child AND obesity: 970

Child AND weight: 2906

Teen and obesity: 301

Teen AND weight: 526


Adolescent AND obesity: 301

Adolescent and weight: 526

6107 unduplicated

De-duplicated: 3168

# Appendix C. Screening and Data Abstraction Forms



ritu.sharma

Project

Childhood Obesity ([Switch](#))

User

Margaret.Peterson ([My Settings](#))

Messages

[Nothing new](#)

Live Support

User Guide

Review

Datarama

Reports

References

Forms

Manage Levels

Users

Project

Logout

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.  
Rethnam U, Yesupalan RS, Sinha A.

Submit Form

 and go to  or [Skip to Next](#)

1. Does this title/abstract apply to any of the above Key questions ([Key Questions](#))? Exclude if Title includes populations from [these countries](#).

☐ No

☐ Yes

[Clear Response](#)

Submit Form

 and go to  or [Skip to Next](#)



Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.

Rethnam U, Yesupalan RS, Sinha A.

BACKGROUND: Skateboarding has been a popular sport among teenagers even with its attendant associated risks. The literature is packed with articles regarding the perils of skateboards. Is the skateboard as dangerous as has been portrayed?

METHODS: This was a retrospective study conducted over a 5 year period. All skateboard related injuries seen in the Orthopaedic unit were identified and data collated on patient demographics, mechanism & location of injury, annual incidence, type of injury, treatment needed including hospitalisation.

RESULTS: We encountered 50 patients with skateboard related injuries. Most patients were males and under the age of 15. The annual incidence has remained low at about 10. The upper limb was predominantly involved with most injuries being fractures. Most injuries occurred during summer. The commonest treatment modality was plaster immobilisation. The distal radius was the commonest bone to be fractured. There were no head & neck injuries, open fractures or injuries requiring surgical intervention.

CONCLUSION: Despite its negative image among the medical fraternity, the skateboard does not appear to be a dangerous sport with a low incidence and injuries encountered being not severe. Skateboarding should be restricted to supervised skateboard parks and skateboarders should wear protective gear. These measures would reduce the number of skateboarders injured in motor vehicle collisions, reduce the personal injuries among skateboarders, and reduce the number of pedestrians injured in collisions with skateboarders.

Submit Form and go to or Skip to Next

KEY QUESTIONS

- KQ 1: What is the comparative effectiveness of school-based interventions for the prevention of obesity or for preventing the progression of obesity in children?
- KQ 2: What is the comparative effectiveness of home-based interventions for the prevention of obesity or for preventing the progression of obesity in children?
- KQ 3: What is the comparative effectiveness of primary care-based interventions for the prevention of obesity or for preventing the progression of obesity in children?
- KQ 4: What is the comparative effectiveness of child-care setting-based interventions for the prevention of obesity or for preventing the progression of obesity in children?
- KQ 5: What is the comparative effectiveness of community-based interventions for the prevention of obesity or for preventing the progression of obesity in children?
- KQ 6: What is the comparative effectiveness of environment-level interventions for the prevention of obesity or for preventing the progression of obesity in children?
- KQ 7: What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or for preventing the progression of obesity in children?
- KQ 8: Which multisetting interventions for the prevention of obesity or for preventing the progression of obesity in children?

1. ☐ non-English abstract
2. Does this title/abstract apply to any of the above Key questions? (see PICOTS)
- ☒ No (answer reasons for exclusion)
- Exclude article from review
- ☐ No original data
- ☐ Does not measure weight as an outcome
- ☐ Study includes ONLY overweight or obese children
- ☐ Followup < 1 year (exception: school-based interventions must have at least 6 months follow-up)
- ☐ Study of adults only
- ☐ Study does not take place in a setting of interest (e.g., school, home, childcare setting, etc.)
- ☐ Entire study population is defined by a disease (except obesity)
- ☐ No intervention
- ☐ No human data reported
- ☐ Abstract only
- ☐ Qualitative study (focus group, directed interviews)
- ☐ Does not apply to key questions
- Clear Response
- ☐ Yes (article may be eligible for review)
- ☐ Unclear (screen article)
- Clear Response
6. Comment

Submit Form and go to or Skip to Next

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.  
Fethnarr L, Yesupan RS, Saha A.

BACKGROUND: Skateboarding has been a popular sport among teenagers even with its attendant associated risks. The literature is packed with articles regarding the perils of skateboards. Is the skateboard as dangerous as has been portrayed?

METHODS: This was a retrospective study conducted over a 5 year period. All skateboard related injuries seen in the Orthopaedic unit were identified and data collected on patient demographics, mechanism & location of injury, annual incidence, type of injury, treatment needed including hospitalisation.

RESULTS: We encountered 50 patients with skateboard related injuries. Most patients were males and under the age of 15. The annual incidence has remained low at about 10. The upper limb was predominantly involved with most injuries being fractures. Most injuries occurred during summer. The commonest treatment modality was plaster immobilisation. The distal radius was the commonest bone to be fractured. There were no head & neck injuries, open fractures or injuries requiring surgical intervention.

CONCLUSION: Despite its negative image among the medical fraternity, the skateboard does not appear to be a dangerous sport with a low incidence and injuries encountered being not severe. Skateboarding should be restricted to supervised skateboard parks and skateboarders should wear protective gear. These measures would reduce the number of skateboarders injured in motor vehicle collisions, reduce the personal injuries among skateboarders, and reduce the number of pedestrians injured in collisions with skateboarders.

Submit Form and go to or Skip to Next

KEY QUESTIONS

- KQ 1: What is the comparative effectiveness of school-based interventions for the prevention of obesity or for preventing the progression of obesity in children?  
KQ 2: What is the comparative effectiveness of home-based interventions for the prevention of obesity or for preventing the progression of obesity in children?  
KQ 3: What is the comparative effectiveness of primary care-based interventions for the prevention of obesity or for preventing the progression of obesity in children?  
KQ 4: What is the comparative effectiveness of child-care setting-based interventions for the prevention of obesity or for preventing the progression of obesity in children?  
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KQ 6: What is the comparative effectiveness of environment-level interventions for the prevention of obesity or for preventing the progression of obesity in children?  
KQ 7: What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or for preventing the progression of obesity in children?  
KQ 8: Which multisetting interventions for the prevention of obesity or for preventing the progression of obesity in children?

1. ☐ non-English abstract
2. Does this title/abstract apply to any of the above Key questions? (see PICOTS)
- ☐ No (answer reasons for exclusion)  
☐ Yes (article may be eligible for review)  
☒ Unclear (screen article)  
Clear Response
- ☐ No abstract available  
☒ Other reason  
Clear Response
6. Comment
- Submit Form and go to or Skip to Next

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.  
Rethnarr L, Yesupaan RS, Sinha A.

Submit Form and go to or Skip to Next

KEY QUESTIONS

KQ 1: What is the comparative effectiveness of school-based interventions for the prevention of obesity or for preventing the progression of obesity in children?  
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KQ 7: What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or for preventing the progression of obesity in children?  
KQ 8: Which multisetting interventions for the prevention of obesity or for preventing the progression of obesity in children?

1.

non-English abstract

2. Does this article apply to any of the above Key Questions? (see PICOTS)

No (answer reasons for exclusion)  
Exclude article from review

- No original data
- Systematic review that is applicable to KQs (pull for hand searching)  
Clear Response
- Does not measure weight as an outcome
- No abstractable data
- Study includes ONLY overweight or obese children
- Follow up < 1 year (unless the study takes place in a school-based setting; Follow-up must be at least 6 months)
- Study of adults only
- Study does not take place in a setting of interest (e.g., school, home, childcare setting, etc.)
- Study does not take place in an included country (see distributed list of countries)
- Entire study population is defined by a disease (except obesity)
- No intervention
- No human data reported
- Abstract only
- Qualitative study (focus group, directed interviews)
- Does not apply to key questions  
Clear Response

Yes (article may be eligible for review)  
Clear Response

7. Comment

Submit Form and go to or Skip to Next

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.  
Rethnam U, Yesupalan RS, Sinha A.

and go to  or [Skip to Next](#)

KEY QUESTIONS

KQ 1: What is the comparative effectiveness of school-based interventions for the prevention of obesity or for preventing the progression of obesity in children?  
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KQ 7: What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or for preventing the progression of obesity in children?  
KQ 8: Which multisetting interventions for the prevention of obesity or for preventing the progression of obesity in children?

1.

☐ non-English abstract

2. Does this article apply to any of the above Key Questions? (see PICOTS)

- ☐ No (answer reasons for exclusion)
- ☒ Yes (article may be eligible for review)

5. Include article (identify key question)

- ☐ KQ1: school-based intervention
- ☐ KQ2: home-based intervention
- ☐ KQ3: primary care-based intervention
- ☐ KQ4: child care setting-based intervention
- ☐ KQ5: Community-based intervention
- ☐ KQ6: environment-level intervention
- ☐ KQ7: consumer health informatics applications

☒ KQ8: multi-setting

6. Study settings (for KQ 8 only)

- ☐ School-based
- ☐ Home-based
- ☐ Primary care-based
- ☐ Child care based
- ☐ Community or environment-level
- ☐ Consumer health informatics

[Clear Response](#)

[Clear Response](#)

7. Comment

and go to  or [Skip to Next](#)

Item: 12. Workload: Are they really parents? / research on study from a different hospital.

Re: from B. Vergeer, PG, Site A.

[Submit Form] and go to [Go] or Skip to Next

Study Characteristics

1. Should this study be included?

☒ Yes

4. If the study is included, please indicate from what study it is included—IDENTIFY which study you are adding to the form.

5. Is the study's stated goal clearly present in children?

☒ Yes

☐ No/No response

6. Does the study have a name?

☒ Yes

7.

8. If the study refers to another publication or if the author has information about the study design, characteristics, or results or whether the author has information, please provide the reference; if not, enter information here ONLY if it is an article with data from the same parent study.

☐ No

[Clear Response](#)

9. Years of recruitment or enrollment (calendar years)

☐ Start year

☐ End year

☐ Not reported

10. Planned length of follow-up (in weeks).

Enter "NR" if not reported

11. Study location

☐ Enter location by country (U.S., Canada, etc.)

☐ Not reported

12. Recruitment setting (choose all that apply)

☐ School

☐ Home

☐ Primary care

☐ Child-care

☐ Community (e.g., health fair, church, TV, newspaper, electronic ads, etc.)

☐ Not reported

☐ Other

13. Study design

☐ Randomized intervention

☐ Nonrandomized intervention

☐ Natural experiment

☐ Other (describe)

Indication of inclusion or exclusion criteria: < Inclusion or exclusion criteria >  
The inclusion or exclusion criteria are as follows: < Inclusion or exclusion criteria >

Criteria	Boys	Girls	Age	BMI (mean, median, range)	Other study measures	Grade	Language (spoken/understood)	Ethnicity	Other
14. Inclusion/Exclusion	15. Use > for greater than or equal to; Use < for less than or equal to	16. Use > for greater than or equal to; Use < for less than or equal to	17. Use > for greater than or equal to; Use < for less than or equal to	18. Use > for greater than or equal to; Use < for less than or equal to	19. Use > for greater than or equal to; Use < for less than or equal to	20. Enter Grade range as specified in the paper	21. Enter Language range as specified in the paper	22. Enter Ethnicity range as specified in the paper	23. Enter Other range as specified in the paper
14. Inclusion/Exclusion	Boys only Not listed as an inclusion criterion	Girls only Not listed as an inclusion criterion	Age Not listed as an inclusion criterion	BMI (mean, median, range) Not listed as an inclusion criterion	Other study measures Not listed as an inclusion criterion	Grade Not listed as an inclusion criterion	Language (spoken/understood) Not listed as an inclusion criterion	Ethnicity Not listed as an inclusion criterion	Other Not listed as an inclusion criterion

24. COMMENTS about study or topic (e.g.,)

☐ No--exclude for reasons below  
[Clear Response](#)

24. R2 only: if you are reviewing R1 data entry, enter your initials when you have completed the audit

and go to  or [Skip to Next](#)



darcy.ward Yoha.Chelladurai

**Project** Childhood Obesity (Switch) **User** Margaret.Peterson (My Settings)  
**Messages** Nothing new  
[Live Support](#) [User Guide](#)

[Review](#)[Datarama](#)[Reports](#)[References](#)[Forms](#)[Manage Levels](#)[Users](#)[Project](#)[Logout](#)

**Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.**  
Rethnam U, Yesupalan RS, Sinha A.

[Submit Form](#) and go to [Previous](#) or [Skip to Next](#)

### Study Characteristics

#### 1. Should this study be included?

- ☐ Yes  
☒ No--exclude for reasons below

2.

- ☐ No original data
- ☐ Does not measure weight as an outcome
- ☐ Includes ONLY overweight or obese children
- ☒ Follow-up <1 year (school based studies only require a follow-up of a minimum of 6 months)
- ☐ Does not take place in a setting of interest
- ☐ Does not take place in an included country (see distributed HDI list)
- ☐ Entire study population is defined by a disease (except obesity)
- ☐ No intervention
- ☐ Abstract only
- ☐ Qualitative study (focus groups, directed interviews)
- ☐ Does not apply to the key questions

[Clear Response](#)

#### 3. Comment for excluded articles (Mandatory)

[Clear Response](#)

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.  
Rethnam U, Yesupalan RS, Sinha A.

[\[Submit Form\]](#) and go to [\[🔍\]](#) or [Skip to Next](#)

DESCRIPTION of INTERVENTIONS

1. If this article presents outcomes from multiple studies--IDENTIFY which study you are abstracting in this form.

ARM 1--always use for control group

2. Control (Arm 1)

- ☐ No control/all arms were active
- ☐ Usual care/no intervention
- ☐ Other (define)

3. **Arm 2**  
(brief description or nickname: e.g., "ADA diet")

4. Length of intervention (in weeks)

5. Setting

Describe in detail--(see examples)

- ☐ School (describe)
- ☐ Home (describe)
- ☐ Primary care (describe)
- ☐ Child care (describe)
- ☐ Community or environment-level (describe)
- ☐ Consumer health informatics (describe)

6. Is the intervention targeting policy change (check if yes)

- ☐ Yes

Description of the intervention

Goal Intervention (see definitions)	Target of intervention	Delivered by	Describe	Comment-Add any additional information that did
-------------------------------------	------------------------	--------------	----------	---



<input type="checkbox"/> Pedometer age ment	<input type="checkbox"/> Family/Caregiv er	<input type="checkbox"/> Teacher		
<input type="checkbox"/> Self weighing	<input type="checkbox"/> Educator	<input type="checkbox"/> Other		
<input type="checkbox"/> Food diary	<input type="checkbox"/> Other			
<input type="checkbox"/> Sleep time				
<input type="checkbox"/> Other (describe)				

36. **GENERAL COMMENTS**  
enter other important details on the sutdy and notes for the other reviewers and writers.

37. **Arm 3**  
(Add descriptor or risk score, e.g., "ADA c10")

38. Length of intervention (in weeks)

39. Setting  
Describe in detail--(see examples)

<input type="checkbox"/> School (describe)	
<input type="checkbox"/> Home (describe)	
<input type="checkbox"/> Primary care (describe)	
<input type="checkbox"/> Child care (describe)	
<input type="checkbox"/> Community or environment-level (describe)	
<input type="checkbox"/> Consumer health informatics (describe)	

40. Is the intervention targeting policy change (check if yes)

Description of the Intervention

Goal Intervention (see definitions)	Target of intervention	Delivered by	Describe Include details on duration, frequency, and intensity of the intervention (e.g., length of time exercising, number of times exercising per week, estimated calories burned, etc.)	Comment-Add any additional informatio that did not fit into previous cells
41. Psychosocial intervention targeting dietary intake <div></div>	42. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiv er <input type="checkbox"/> Family	43. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher	44. <input type="checkbox"/> Duration (e.g., length of educational or counseling sessions) <input type="checkbox"/> Frequency (e.g., number of sessions per week) <input type="checkbox"/> Other	45. <div></div>

	<input type="checkbox"/> Educator <input type="checkbox"/> Other	<input type="checkbox"/> Other		
46. Physical or environmental intervention targeting dietary intake <input type="text"/>	47. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	48. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	49. <input type="checkbox"/> Change in intake (e.g., increased fruit and vegetable intake; decrease fat intake) <input type="checkbox"/> Change in calorie intake <input type="checkbox"/> Other	50. <input type="text"/>
51. Psychosocial intervention targeting exercise/physical activity <input type="text"/>	52. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	53. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	54. <input type="checkbox"/> Duration (e.g., length of educational or counseling sessions) <input type="checkbox"/> Frequency (e.g., number of sessions per week) <input type="checkbox"/> Other	55. <input type="text"/>
56. Physical or environmental intervention targeting physical activity or exercise. <input type="text"/>	57. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	58. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	59. <input type="checkbox"/> Duration (e.g., time in minutes/ session) <input type="checkbox"/> Frequency (e.g., session/week) <input type="checkbox"/> Other	60. <input type="text"/>
Decrease sedentary behavior <input type="text"/>	61. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	62. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	63. <input type="text"/>	64. <input type="text"/>
65. Other (choose all that apply) <input type="checkbox"/> Goal setting <input type="checkbox"/> Stress management <input type="checkbox"/> Pedometer <input type="checkbox"/> Self weighing <input type="checkbox"/> Food diary <input type="checkbox"/> Sleep time <input type="checkbox"/> Other (describe)	66. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	67. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	68. <input type="text"/>	69. <input type="text"/>

70. **GENERAL COMMENTS**  
enter other important details on the study and notes for the other reviewers and writers.

71. **Arm 4**  
(brief descriptor or risk score, e.g., "ADA diet")

72. Length of intervention (in weeks)

73. Setting  
Describe in detail--(see examples)

☐ School (describe)

☐ Home (describe)

☐ Primary care (describe)

☐ Child care (describe)

☐ Community or environment-level (describe)

☐ Consumer health informatics (describe)

74. Is the intervention targeting policy change (check if yes)

☐ Yes

Description of the intervention

Goal Intervention (see definitions)	Target of intervention	Delivered by	Describe Include details on duration, frequency, and intensity of the intervention (e.g., length of time exercising, number of times exercising per week, estimated calories burned, etc.)	Comment-Add any additional information that did not fit into previous cells.
75. Psychosocial intervention targeting dietary intake <div></div>	76. <div><div><input type="checkbox"/> Child</div><div><input type="checkbox"/> Parent/Caregiver</div><div><input type="checkbox"/> Family</div><div><input type="checkbox"/> Educator</div><div><input type="checkbox"/> Other</div></div> <div></div>	77. <div><div><input type="checkbox"/> Researcher</div><div><input type="checkbox"/> Clinician</div><div><input type="checkbox"/> Teacher</div><div><input type="checkbox"/> Other</div></div> <div></div>	78. <div><div><input type="checkbox"/> Duration (e.g., length of educational or counseling sessions)</div><div><input type="checkbox"/> Frequency (e.g., number of sessions per week)</div><div><input type="checkbox"/> Other</div></div> <div><div></div><div></div><div></div></div>	79. <div></div>
80. Physical or environmental intervention targeting dietary intake <div></div>	81. <div><div><input type="checkbox"/> Child</div><div><input type="checkbox"/> Parent/Caregiver</div><div><input type="checkbox"/> Family</div></div>	82. <div><div><input type="checkbox"/> Researcher</div><div><input type="checkbox"/> Clinician</div><div><input type="checkbox"/> Teacher</div></div>	83. <div><div><input type="checkbox"/> Change in intake (e.g., increased fruit and vegetable intake; decrease fat intake)</div><div><input type="checkbox"/> Change in calorie intake</div></div> <div><div></div><div></div></div>	84. <div></div>

	<input type="checkbox"/> Educator <input type="checkbox"/> Other	<input type="checkbox"/> Other	<input type="checkbox"/> Other	
95. Psychosocial intervention targeting exercise/physical activity <div></div>	96. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	97. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	98. <input type="checkbox"/> Duration (e.g., length of educational or counseling sessions) <input type="checkbox"/> Frequency (e.g., number of sessions per week) <input type="checkbox"/> Other	99. <div></div>
100. Physical or environmental intervention targeting physical activity or exercise <div></div>	101. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	102. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	103. <input type="checkbox"/> Duration (e.g., time in minutes/ session) <input type="checkbox"/> Frequency (e.g., session/week) <input type="checkbox"/> Other	104. <div></div>
Decrease sedentary behavior <div></div>	105. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	106. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	107. <div></div>	108. <div></div>
109. Other (choose all that apply) <input type="checkbox"/> Goal setting <input type="checkbox"/> Stress management <input type="checkbox"/> Pedometer <input type="checkbox"/> Self weighing <input type="checkbox"/> Food diary <input type="checkbox"/> Sleep time <input type="checkbox"/> Other (describe)	110. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	111. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	112. <div></div>	113. <div></div>

104.

GENERAL COMMENTS

enter other important details on the study and notes for the other reviewers and writers.

(brief description or nickname; e.g., "ADA diet")

106. Length of intervention (in weeks)

107. Setting  
Describe in detail--(see examples)

☐ School (describe)

☐ Home (describe)

☐ Primary care (describe)

☐ Child care (describe)

☐ Community or environment-level (describe)

☐ Consumer health informatics (describe)

108. Is the intervention targeting policy change (check if yes)

☐ Yes

Description of the intervention

Goal Intervention (see definitions)	Target of intervention	Delivered by	Describe Include details on duration, frequency, and intensity of the intervention (e.g., length of time exercising, number of times exercising per week, estimated calories burned, etc.)	Comment-Add any additional information that did not fit into previous cells
109. Psychosocial intervention targeting dietary intake <div></div>	110. <div><div><input type="checkbox"/> Child</div><div><input type="checkbox"/> Parent/Caregiver</div><div><input type="checkbox"/> Family</div><div><input type="checkbox"/> Educator</div><div><input type="checkbox"/> Other</div><div></div></div>	111. <div><div><input type="checkbox"/> Researcher</div><div><input type="checkbox"/> Clinician</div><div><input type="checkbox"/> Teacher</div><div><input type="checkbox"/> Other</div><div></div></div>	112. <div><div><input type="checkbox"/> Duration (e.g., length of educational or counseling sessions)</div><div></div><div><input type="checkbox"/> Frequency (e.g., number of sessions per week)</div><div></div><div><input type="checkbox"/> Other</div><div></div></div>	113. <div></div>
114. Physical or environmental intervention targeting dietary intake <div></div>	115. <div><div><input type="checkbox"/> Child</div><div><input type="checkbox"/> Parent/Caregiver</div><div><input type="checkbox"/> Family</div><div><input type="checkbox"/> Educator</div><div><input type="checkbox"/> Other</div><div></div></div>	116. <div><div><input type="checkbox"/> Researcher</div><div><input type="checkbox"/> Clinician</div><div><input type="checkbox"/> Teacher</div><div><input type="checkbox"/> Other</div><div></div></div>	117. <div><div><input type="checkbox"/> Change in intake (e.g., increased fruit and vegetable intake; decrease fat intake)</div><div></div><div><input type="checkbox"/> Change in calorie intake</div><div></div><div><input type="checkbox"/> Other</div><div></div></div>	118. <div></div>
119. Psychosocial intervention targeting exercise/physical activity <div></div>	120. <div><div><input type="checkbox"/> Child</div><div><input type="checkbox"/> Parent/Caregiver</div><div><input type="checkbox"/> Family</div></div>	121. <div><div><input type="checkbox"/> Researcher</div><div><input type="checkbox"/> Clinician</div><div><input type="checkbox"/> Teacher</div></div>	122. <div><div><input type="checkbox"/> Duration (e.g., length of educational or counseling sessions)</div><div></div><div><input type="checkbox"/> Frequency (e.g., number of sessions per week)</div><div></div></div>	123. <div></div>

	<input type="checkbox"/> Educator <input type="checkbox"/> Other	<input type="checkbox"/> Other	<input type="checkbox"/> Other	
124. Physical or environmental intervention targeting physical activity or exercise. <div></div>	125. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	126. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	127. <input type="checkbox"/> Duration (e.g., time in minutes/ session) <input type="checkbox"/> Frequency (e.g., session/week) <input type="checkbox"/> Other	128. <div></div>
Decrease sedentary behavior	129. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	130. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	131. <div></div>	132. <div></div>
133. Other (choose all that apply) <input type="checkbox"/> Goal setting <input type="checkbox"/> Stress management <input type="checkbox"/> Pedometer <input type="checkbox"/> Self weighing <input type="checkbox"/> Food diary <input type="checkbox"/> Sleep time <input type="checkbox"/> Other (describe)	134. <input type="checkbox"/> Child <input type="checkbox"/> Parent/Caregiver <input type="checkbox"/> Family <input type="checkbox"/> Educator <input type="checkbox"/> Other	135. <input type="checkbox"/> Researcher <input type="checkbox"/> Clinician <input type="checkbox"/> Teacher <input type="checkbox"/> Other	136. <div></div>	137. <div></div>

130. **GENERAL COMMENTS**  
enter other important details on the study and notes for the other reviewers and writers.

139. **Arm 6**  
(full description or nickname: e.g., "ADA diet")

140. Length of intervention (in weeks)

141. Setting  
Describe in detail--(see examples)

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.  
Rethnam U, Yesupalan RS, Sinha A.

Submit Form and go to or Skip to Next

Participant Characteristics at Baseline

1. If this article presents outcomes from multiple studies--IDENTIFY which study you are abstracting in this form.

2. Total N at baseline

- ☒ N  
☐ Not reported

Define Groups

INSTRUCTIONS:  
If information is available for the total populations at baseline, complete the first column and ONLY the first column.  
If information is only available by intervention/exposure groups, complete the Groups columns.  
If information is not available by intervention/exposure groups, select other and briefly describe group.  
If the Group Ns at baseline do not add up to the Total Population N at baseline, please contact the 2nd reviewer before abstracting.

Be consistent in Arm designations. This should match the Arm/Group you described in the Interventions form.  
If the study is reported not only by intervention arm, but also by subgroup use the "other" option for the arm and describe.

Overall group	3. Arm 1 (always use for control) Leave blank if there is no control group Select an Answer	4. Arm 2 Select an Answer	5. Arm 3 Select an Answer	6. Arm 4 Select an Answer	7. Arm 5 Select an Answer	8. Arm 6 Select an Answer
9. <input type="checkbox"/> N	10. <input type="checkbox"/> n	11. <input type="checkbox"/> n	12. <input type="checkbox"/> n	13. <input type="checkbox"/> n	14. <input type="checkbox"/> n	15. <input type="checkbox"/> n

16. Follow-up time in weeks from the beginning of the intervention/exposure

- ☐ Mean  
☐ Median  
☐ Maximum  
☐ Minimum  
☐ Not reported

For all participant characteristics below: report numbers to a maximum of 3 significant digits

18. Sex

☒ reported

Overall Group	Arm 1	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6
19. <input type="checkbox"/> girls, n <input type="checkbox"/> girls, %	20. <input type="checkbox"/> girls, n <input type="checkbox"/> girls, %	21. <input type="checkbox"/> girls, n <input type="checkbox"/> girls, %	22. <input type="checkbox"/> girls, n <input type="checkbox"/> girls, %	23. <input type="checkbox"/> girls, n <input type="checkbox"/> girls, %	24. <input type="checkbox"/> girls, n <input type="checkbox"/> girls, %	25. <input type="checkbox"/> girls, n <input type="checkbox"/> girls, %

26. If sex differs by group, please describe

☐ not reported

27. Age

☒ reported

Overall Group	Arm 1	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6
28. <input type="checkbox"/> mean <input type="checkbox"/> SD <input type="checkbox"/> Median <input type="checkbox"/> Range	29. <input type="checkbox"/> mean <input type="checkbox"/> SD <input type="checkbox"/> Median <input type="checkbox"/> Range	30. <input type="checkbox"/> mean <input type="checkbox"/> SD <input type="checkbox"/> Median <input type="checkbox"/> Range	31. <input type="checkbox"/> mean <input type="checkbox"/> SD <input type="checkbox"/> Median <input type="checkbox"/> Range	32. <input type="checkbox"/> mean <input type="checkbox"/> SD <input type="checkbox"/> Median <input type="checkbox"/> Range	33. <input type="checkbox"/> mean <input type="checkbox"/> SD <input type="checkbox"/> Median <input type="checkbox"/> Range	34. <input type="checkbox"/> mean <input type="checkbox"/> SD <input type="checkbox"/> Median <input type="checkbox"/> Range

35. If age differs by group, please describe

☐ not reported

36. Race/ethnicity

☒ Reported

	Overall Group	Arm 1	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6
White, non-Hispanic	37. <input type="checkbox"/> n <input type="checkbox"/> %	38. <input type="checkbox"/> n <input type="checkbox"/> %	39. <input type="checkbox"/> n <input type="checkbox"/> %	40. <input type="checkbox"/> n <input type="checkbox"/> %	41. <input type="checkbox"/> n <input type="checkbox"/> %	42. <input type="checkbox"/> n <input type="checkbox"/> %	43. <input type="checkbox"/> n <input type="checkbox"/> %
Black, non-Hispanic	44. <input type="checkbox"/> n	45. <input type="checkbox"/> n	46. <input type="checkbox"/> n	47. <input type="checkbox"/> n	48. <input type="checkbox"/> n	49. <input type="checkbox"/> n	50. <input type="checkbox"/> n



	<input type="checkbox"/> n <input type="checkbox"/> %	<input type="checkbox"/> n <input type="checkbox"/> %	<input type="checkbox"/> n <input type="checkbox"/> %	<input type="checkbox"/> n <input type="checkbox"/> %	<input type="checkbox"/> n <input type="checkbox"/> %	<input type="checkbox"/> n <input type="checkbox"/> %	<input type="checkbox"/> n <input type="checkbox"/> %
Asian/Pacific Islander	58. <input type="checkbox"/> n <input type="checkbox"/> %	59. <input type="checkbox"/> n <input type="checkbox"/> %	60. <input type="checkbox"/> n <input type="checkbox"/> %	61. <input type="checkbox"/> n <input type="checkbox"/> %	62. <input type="checkbox"/> n <input type="checkbox"/> %	63. <input type="checkbox"/> n <input type="checkbox"/> %	64. <input type="checkbox"/> n <input type="checkbox"/> %
American Indian/Alaska Native	65. <input type="checkbox"/> n <input type="checkbox"/> %	66. <input type="checkbox"/> n <input type="checkbox"/> %	67. <input type="checkbox"/> n <input type="checkbox"/> %	68. <input type="checkbox"/> n <input type="checkbox"/> %	69. <input type="checkbox"/> n <input type="checkbox"/> %	70. <input type="checkbox"/> n <input type="checkbox"/> %	71. <input type="checkbox"/> n <input type="checkbox"/> %
72. Other	73. <input type="checkbox"/> n <input type="checkbox"/> %	74. <input type="checkbox"/> n <input type="checkbox"/> %	75. <input type="checkbox"/> n <input type="checkbox"/> %	76. <input type="checkbox"/> n <input type="checkbox"/> %	77. <input type="checkbox"/> n <input type="checkbox"/> %	78. <input type="checkbox"/> n <input type="checkbox"/> %	79. <input type="checkbox"/> n <input type="checkbox"/> %
80. Other	81. <input type="checkbox"/> n <input type="checkbox"/> %	82. <input type="checkbox"/> n <input type="checkbox"/> %	83. <input type="checkbox"/> n <input type="checkbox"/> %	84. <input type="checkbox"/> n <input type="checkbox"/> %	85. <input type="checkbox"/> n <input type="checkbox"/> %	86. <input type="checkbox"/> n <input type="checkbox"/> %	87. <input type="checkbox"/> n <input type="checkbox"/> %
88. Other	89. <input type="checkbox"/> n <input type="checkbox"/> %	90. <input type="checkbox"/> n <input type="checkbox"/> %	91. <input type="checkbox"/> n <input type="checkbox"/> %	92. <input type="checkbox"/> n <input type="checkbox"/> %	93. <input type="checkbox"/> n <input type="checkbox"/> %	94. <input type="checkbox"/> 2n <input type="checkbox"/> %	95. <input type="checkbox"/> 2n <input type="checkbox"/> %

96. If race/ethnicity differs by group, please describe

4

☐ not reported

97. Grade

☒ Reported

	Overall Group	Arm 1	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6
98. Grades, or grade ranges of study populations	99. <input type="checkbox"/> n <input type="checkbox"/> %	100. <input type="checkbox"/> n <input type="checkbox"/> %	101. <input type="checkbox"/> n <input type="checkbox"/> %	102. <input type="checkbox"/> n <input type="checkbox"/> %	103. <input type="checkbox"/> n <input type="checkbox"/> %	104. <input type="checkbox"/> n <input type="checkbox"/> %	105. <input type="checkbox"/> n <input type="checkbox"/> %
106. Grades, or grade ranges of study populations	107. <input type="checkbox"/> n <input type="checkbox"/> %	108. <input type="checkbox"/> n <input type="checkbox"/> %	109. <input type="checkbox"/> n <input type="checkbox"/> %	110. <input type="checkbox"/> n <input type="checkbox"/> %	111. <input type="checkbox"/> n <input type="checkbox"/> %	112. <input type="checkbox"/> n <input type="checkbox"/> %	113. <input type="checkbox"/> n <input type="checkbox"/> %

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122. If education differs by group, please describe

/

☐ not reported

123. Other Comments

/

124. **R2 only: If you are reviewing R1 data entry, enter your initials when you have completed the audit**

and go to      or Skip to Next

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 Rathnam U, Yesupalan RS, Sinha A.

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## Participant Characteristics at Baseline

1. If this article presents outcomes from multiple studies—IDENTIFY which study you are abstracting in this form.

2. Total N at baseline

- ☐ N  
☒ Not reported

Define Groups

### INSTRUCTIONS:

If information is available for the total populations at baseline, complete the first column and ONLY the first column.

If information is only available by intervention/exposure groups, complete the Groups columns.

If information is not available by intervention/exposure groups, select other and briefly describe group.

If the Group Na at baseline do not add up to the Total Population N at baseline, please contact the 2nd reviewer before abstracting.

Be consistent in Arm designations. This should match the Arm/Group you described in the Interventions form.

If the study is reported not only by intervention arm, but also by subgroup use the "other" option for the arm and describe.

Overall group	3. Arm 1 (always use for control) Leave blank if there is no control group Select an Answer	4. Arm 2 Select an Answer	5. Arm 3 Select an Answer	6. Arm 4 Select an Answer	7. Arm 5 Select an Answer	8. Arm 6 Select an Answer
9. <input type="checkbox"/> N	10. <input type="checkbox"/> n	11. <input type="checkbox"/> n	12. <input type="checkbox"/> n	13. <input type="checkbox"/> n	14. <input type="checkbox"/> n	15. <input type="checkbox"/> n

16. Follow-up time in weeks from the beginning of the intervention/exposure

- ☐ Mean  
☐ Median  
☐ Maximum

16  
For all participant characteristics below: report numbers to a maximum of 3 significant digits

18. Sex

- ☐ reported  
☒ not reported

27. Age

- ☐ reported  
☒ not reported

36. Race/ethnicity

- ☐ Reported  
☒ not reported

97. Grade

- ☐ Reported  
☒ not reported

123. Other Comments

16  
124. R2 only: If you are reviewing R1 data entry, enter your initials when you have completed the audit

and go to  or Skip to Next

Refid: 12. **Skateboards: Are they really perilous? A retrospective study from a district hospital.**  
Rethnam U, Y esupalan RS, Siritha A.

[Submit Form] and go to [Previous] or Skip to Next

1. **Weight Outcome** (choose one)

Select an Answer

2. How was the weight outcome measured?

Select an Answer

3. Was there a subgroup analysis in this **article**?

(are weight results or interventions stratified by groups or p for interaction reported)

☒ Yes

☐ No

Clear Response

4. Is **subgroup analysis data** presented *in this item*?

☒ Yes

5. Identify subgroup analysis data presented in this form.

- ☐ Age
- ☐ Race
- ☐ Sex
- ☐ Family SES (e.g., parental education or family income)
- ☐ Other (define)
- ☐ Other (define)
- ☐ Other (define)

☐ No

Clear Response

Arm 1 (Control group)	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6
Leave blank if there is no control group					
6. Baseline, n <div></div>	7. Baseline, n <div></div>	8. Baseline, n <div></div>	9. Baseline, n <div></div>	10. Baseline, n <div></div>	11. Baseline, n <div></div>
12. Baseline measure <div><input type="checkbox"/> mean <div></div><input type="checkbox"/> median <div></div><input type="checkbox"/> range <div></div><input type="checkbox"/> SD <div></div><input type="checkbox"/> se <div></div><input type="checkbox"/> CI_LL <div></div><input type="checkbox"/> CI_UL <div></div></div>	13. Baseline measure <div><input type="checkbox"/> mean <div></div><input type="checkbox"/> median <div></div><input type="checkbox"/> range <div></div><input type="checkbox"/> SD <div></div><input type="checkbox"/> se <div></div><input type="checkbox"/> CI_LL <div></div><input type="checkbox"/> CI_UL <div></div></div>	14. Baseline measure <div><input type="checkbox"/> mean <div></div><input type="checkbox"/> median <div></div><input type="checkbox"/> range <div></div><input type="checkbox"/> SD <div></div><input type="checkbox"/> se <div></div><input type="checkbox"/> CI_LL <div></div><input type="checkbox"/> CI_UL <div></div></div>	15. Baseline measure <div><input type="checkbox"/> mean <div></div><input type="checkbox"/> median <div></div><input type="checkbox"/> range <div></div><input type="checkbox"/> SD <div></div><input type="checkbox"/> se <div></div><input type="checkbox"/> CI_LL <div></div><input type="checkbox"/> CI_UL <div></div></div>	16. Baseline measure <div><input type="checkbox"/> mean <div></div><input type="checkbox"/> median <div></div><input type="checkbox"/> range <div></div><input type="checkbox"/> SD <div></div><input type="checkbox"/> se <div></div><input type="checkbox"/> CI_LL <div></div><input type="checkbox"/> CI_UL <div></div></div>	17. Baseline measure <div><input type="checkbox"/> mean <div></div><input type="checkbox"/> median <div></div><input type="checkbox"/> range <div></div><input type="checkbox"/> SD <div></div><input type="checkbox"/> se <div></div><input type="checkbox"/> CI_LL <div></div><input type="checkbox"/> CI_UL <div></div></div>
18. 1st follow-up, n (between 24 and 52 weeks) <div><input type="checkbox"/> Follow-up (in weeks) <div></div><div>n</div><div>check if this is the last timepoint reported</div></div>	19. 1st follow-up, n (between 24 and 52 weeks) <div><input type="checkbox"/> Follow-up (in weeks) <div></div><div>n</div><div>check if this is the last timepoint reported</div></div>	20. 1st follow-up, n (between 24 and 52 weeks) <div><input type="checkbox"/> Follow-up (in weeks) <div></div><div>n</div><div>check if this is the last timepoint reported</div></div>	21. 1st follow-up, n (between 24 and 52 weeks) <div><input type="checkbox"/> Follow-up (in weeks) <div></div><div>n</div><div>check if this is the last timepoint reported</div></div>	22. 1st follow-up, n (between 24 and 52 weeks) <div><input type="checkbox"/> Follow-up (in weeks) <div></div><div>n</div><div>check if this is the last timepoint reported</div></div>	23. 1st follow-up, n (between 24 and 52 weeks) <div><input type="checkbox"/> Follow-up (in weeks) <div></div><div>n</div><div>check if this is the last timepoint reported</div></div>
24. First follow-up measure	25. First follow-up measure	26. First follow-up measure	27. First follow-up measure	28. First follow-up measure	29. First follow-up measure

<input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> Mean change <input type="text"/>	<input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> Mean change <input type="text"/>	<input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> Mean change <input type="text"/>	<input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> Mean change <input type="text"/>	<input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> Mean change <input type="text"/>	<input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> Mean change <input type="text"/>
30. 2nd follow-up, n (between 52 and 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	31. 2nd follow-up, n (between 52 and 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	32. 2nd follow-up, n (between 52 and 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	33. 2nd follow-up, n (between 52 and 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	34. 2nd follow-up, n (between 52 and 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	35. 2nd follow-up, n (between 52 and 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported
36. Second follow-up measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	37. Second follow-up measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	38. Second follow-up measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	39. Second follow-up measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	40. Second follow-up measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	41. Second follow-up measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>
42. Final follow-up, n (greater than 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	43. Final follow-up, n (greater than 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	44. Final follow-up, n (greater than 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	45. Final follow-up, n (greater than 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	46. Final follow-up, n (greater than 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported	47. Final follow-up, n (greater than 104 weeks) <input type="checkbox"/> Follow-up (in weeks) <input type="text"/> <input type="checkbox"/> n <input type="text"/> <input type="checkbox"/> check if this is the last timepoint reported
48. Final measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	49. Final measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	50. Final measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	51. Final measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	52. Final measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>	53. Final measure <input type="checkbox"/> mean <input type="text"/> <input type="checkbox"/> median <input type="text"/> <input type="checkbox"/> range <input type="text"/> <input type="checkbox"/> SD <input type="text"/> <input type="checkbox"/> se <input type="text"/> <input type="checkbox"/> CI_LL <input type="text"/> <input type="checkbox"/> CI_UL <input type="text"/> <input type="checkbox"/> mean change <input type="text"/>

54. Describe test for trend or other comments

Measure of Association/Counts/Percentages/Events/Rate

55. Did study report a measure of association (between group difference)?

Yes

56.

☐ First follow-up  
☐ Second follow-up  
☐ Final follow-up  
☐ Other (in weeks)

☐ No  
Clear Response

266. GENERAL COMMENTS

267. R2 only: if you are reviewing R1 data entry, enter your initials when you have completed the audit.

[Submit Form] and go to  or Skip to Next

**Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.**  
Rethnam U, Yesupalan RS, Sinha A.

Submit Form and go to or Skip to Next

### Intermediate Outcomes

1. Identify ALL intermediate outcomes reported in the article

- ☐ None reported
- ☐ Nutrition-related knowledge, attitudes, beliefs, and self-efficacy
- ☐ Physical activity-related knowledge, attitudes, beliefs, and self-efficacy
- ☐ Food purchasing behaviors (for children and/or caregivers)
- ☐ Dietary intake (e.g. energy, nutrients, food groups)
- ☐ Physical activity (e.g. more time spent on outdoor activities)
- ☐ Sedentary behavior (e.g. reduce in screen time)
- ☐ Access to healthy foods (e.g. farmer's markets, supermarkets)
- ☐ Access to PA and/or its facilities (e.g. gym membership, school PE curriculum)
- ☐ Adherence to the intervention
- ☐ Other (describe)



2. Comment

Submit Form

 and go to  or Skip to Next

Refid: 12, Skateboards: *Are they really perilous? A retrospective study from a district hospital.*  
Rethniam U, Yesupalan RS, Sinha A.

[Submit Form](#) and go to [or Skip to Next](#)

Clinical Outcomes and Adverse Events (choose one)	Describe
1. <div>Select an Answer</div>	2. <div></div>

Be consistent in Arm. This should match the Arm you described in the Interventions form.

Arm 1 (use only for control) Leave blank if there is no control group	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6
3. Baseline, n <div></div>	4. Baseline, n <div></div>	5. Baseline, n <div></div>	6. Baseline, n <div></div>	7. Baseline, n <div></div>	8. Baseline, n <div></div>
9. Baseline measure <div><div><input type="checkbox"/> mean</div><div><input type="checkbox"/> median</div><div><input type="checkbox"/> range</div><div><input type="checkbox"/> SD</div><div><input type="checkbox"/> se</div><div><input type="checkbox"/> CI_LL</div><div><input type="checkbox"/> CI_UL</div></div> <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>					

33. Describe between group differences

Measure of Association/Counts/Percentages/Events/Rate

34. Did study report a measure of association?

☒ Yes

35.

- ☐ Last reported time point
- ☐ 24 months
- ☐ 60 months
- ☐ Other (in months)

☐ No

[Clear Response](#)

245. GENERAL COMMENTS

246. R2 only: if you are reviewing R1 data entry, enter your initials when you have completed the audit

[Submit Form](#) and go to [Next](#) or [Skip to Next](#)

**Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.**  
Rethnam U, Yesupalan RS, Sinha A.

[Submit Form](#) and go to [or Skip to Next](#)

## Checklist for measuring study quality

### Reporting

Question	Description	Answer
1. Is the hypothesis/aim/objective of the study clearly described?		1. <input type="radio"/> Yes <input type="radio"/> No
2. Are the main outcomes to be measured clearly described in the Introduction or Methods section?	<i>if the main outcomes are first mentioned in the Results section, the question should be answered no.'</i>	2. <input type="radio"/> Yes <input type="radio"/> No
3. Are the characteristics of the subjects included in the study clearly described?	<i>in trials, inclusion and/or exclusion criteria should be given.</i>	3. <input type="radio"/> Yes <input type="radio"/> No
4. Are the interventions of interest clearly described?	<i>interventions and controls (where relevant) that are to be compared should be clearly described.</i>	4. <input type="radio"/> Yes <input type="radio"/> No

5. Are the distributions of principal confounders in each group of subjects to be compared clearly described?	<i>A list of principal confounders is provided.</i>	5. <input type="radio"/> Yes <input type="radio"/> Partially <input type="radio"/> No
6. Are the main findings of the study clearly described?	<i>Simple outcome data (including denominators and numerators) should be reported for all major findings so that the reader can check the major analyses and conclusions. (This question does not cover statistical tests which are considered below).</i>	6. <input type="radio"/> Yes <input type="radio"/> No
7. Does the study provide estimates of the random variability in the data for the main outcomes?	<i>In non-normally distributed data the inter-quartile range of results should be reported. In normally distributed data the standard error, standard deviation or confidence intervals should be reported. If the distribution of the data is not described, it must be assumed that the estimates used were appropriate and the question should be answered 'yes.'</i>	7. <input type="radio"/> Yes <input type="radio"/> No
8. Have all important adverse events that may be a consequence of the intervention been reported?	<i>This should be answered yes if the study demonstrates that there was a comprehensive attempt to measure adverse events. (A list of possible adverse events is provided).</i>	8. <input type="radio"/> Yes <input type="radio"/> No
9. Have the characteristics of subjects lost to follow-up been described?	<i>This should be answered yes where there were no losses to follow-up or where losses to follow-up were so small that findings would be unaffected by their inclusion. This should be answered 'no' where a study does not report the number of patients lost to follow-up.</i>	9. <input type="radio"/> Yes <input type="radio"/> No
10. Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?		10. <input type="radio"/> Yes <input type="radio"/> No

#### External Validity

Question	Description	Answer
11. Were the subjects asked to	<i>The study must identify the source population for patients and describe how the patients were</i>	11.

participate in the study representative of the entire population from which they were recruited?	<i>selected. Subjects would be representative if they comprised the entire source population, an unselected sample of consecutive patients, or a random sample. Random sampling is only feasible where a list of all members of the relevant population exists. Where a study does not report the proportion of the source population from which the subjects are derived, the question should be answered 'unable to determine.'</i>	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
12. Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	<i>The proportion of those asked who agreed should be stated. Validation that the sample was representative would include demonstrating that the distribution of the main confounding factors was the same in the study sample and the source population.</i>	12. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
13. Were the staff, places, and facilities where the subjects were treated (or where the intervention was implemented) representative of the treatment the majority of subjects receive?	<i>For the question to be answered 'yes' the study should demonstrate that the intervention was representative of that in use in the source population. The question should be answered 'no' if, for example, the intervention was undertaken in a specialist center unrepresentative of the hospitals most of the source population would attend.</i>	13. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine

#### Internal Validity-bias

Question	Description	Answer
14. Was an attempt made to blind study subjects to the intervention they have received?	<i>For studies where the subjects would have no way of knowing which intervention they received, this should be answered 'yes.'</i>	14. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
15. Was an attempt made to blind those measuring the main outcomes of the intervention?		15. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
16. If any of the results of the	<i>Any analyses that had not been planned at the outset of the study should be clearly indicated. If no</i>	16.



study were based on "data dredging", was this made clear?	<i>retrospective unplanned subgroup analyses were reported, then answer 'yes.'</i>	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
17. In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients?	<i>Where follow-up was the same for all study participants the answer should be 'yes.' If different lengths of follow-up were adjusted, for example, by survival analysis, the answer should be 'yes.' Studies where differences in follow-up are ignored should be answered 'no.'</i>	17. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
18. Were the statistical tests used to assess the main outcomes appropriate?	<i>The statistical techniques used must be appropriate to the data. For example nonparametric methods should be used for small sample sizes. Where little statistical analysis has been undertaken but where there is no evidence of bias, the question should be answered 'yes.' If the distribution of the data (normal or not) is not described it must be assumed that the estimates used were appropriate and the question should be answered 'yes.'</i>	18. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
19. Was compliance with the intervention/s reliable?	<i>Where there was non-compliance with the allocated treatment or where there was contamination of one group, the question should be answered 'no.' For studies where the effect of any misclassification was likely to bias any association to the null, the question should be answered 'yes.'</i>	19. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
20. Were the main outcome measures used accurate (valid and reliable)?	<i>For studies where the outcome measures are clearly described, the question should be answered 'yes.' For studies which refer to other work or that demonstrates the outcome measures are accurate, the question should be answered 'yes.'</i>	20. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine

#### Internal Validity-confounding and selection bias

Question	Description	Answer
21. Were the subjects in different intervention groups (trials and cohort studies) recruited from the same population?	<i>For example, subjects for all comparison groups should be selected from the same school. The question should be answered unable to determine for cohort where there is no information concerning the source of subjects included in the study.</i>	21. <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine

<b>22.</b> Were study subjects in different intervention groups (trials and cohort studies) recruited over the same period of time?	<i>For a study which does not specify the time period over which patients were recruited, the question should be answered as unable to determine.</i>	22.  <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
<b>23.</b> Were study subjects randomized to intervention groups?	<i>Studies which state that subjects were randomized should be answered yes except where method of randomization would not ensure random allocation. For example alternate allocation would score no because it is predictable.</i>	23.  <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
<b>24.</b> Was the randomized intervention assignment concealed from both subjects and those conducting the study until recruitment was complete and irrevocable?	<i>All non-randomized studies should be answered 'no.' If assignment was concealed from patients but not from staff, it should be answered 'no.'</i>	24.  <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
<b>25.</b> Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	<i>This question should be answered 'no' for trials if: the main conclusions of the study were based on analyses of treatment rather than intention to treat; the distribution of known confounders in the different treatment groups was not described; or the distribution of known confounders differed between the treatment groups but was not taken into account in the analyses. In non-randomized studies, if the effect of the main confounders was not investigated or confounding was demonstrated but no adjustment was made in the final analyses the question should be answered 'no.'</i>	25.  <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine
<b>26.</b> Were losses of subjects to follow-up taken into account?	<i>If the numbers of subjects lost to follow-up are not reported, the question should be answered 'unable to determine.' If the proportion lost to follow-up was too small to affect the main findings, the question should be answered 'yes.'</i>	26.  <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> unable to determine

#### Power

Question	Description	Answer



# Appendix D. List of Excluded Articles

## No original data

- Adimoolam V, and Charney P. Identification and management of overweight and obesity by internal medicine residents: Christopher B. Ruser Lisa Sanders et al. *J Gen Intern Med*. 2006;21(10):1128.
- Aggarwal A. Stay healthy through game-care therapeutics: It's time to play the game! *Value Health*. 2011;14(7):A298.
- Alborzimanesh M, Kimiagar M, Rashidkhani B, et al. The relation between overweight and obesity with some lifestyle factors in the 3rd-5th grade primary schoolgirls in Tehran City 6th dist [Farsi]. *Iranian Journal of Nutrition Sciences & Food Technology*. 2011;6(3):84.
- Allender S, Osborne R, Bowen S, et al. Measuring the 'system' in whole of system approaches to obesity prevention. *Obes Res Clin Pract*. 2011;5:S51.
- Ambroz TA, Boucher JL. Childhood Obesity: reversing the trend to improve the health of the next generation. *Diabetes Spectr*. 2012;25(1):3-4.
- An R, Sturm R. School and residential neighborhood food environment and diet among California youth. *Am J Prev Med*. 2012;42(2):129-35.
- Anderson AS. Obesity prevention and management. evidence and policy. *J Hum Nutr Diet*. 2005;18(1):1-2.
- Ashworth J. A sporting solution to improving long-term community health. *Prim Health Care*. 2011;21(3):22-4.
- Bainbridge D. A History of FUNFitness. *HPA Resource*. 2011;11(4):1-7.
- Bartholomew JB, Jowers EM. Physically active academic lessons in elementary children. *Prev Med*. 2011;52:S51-4.
- Bartz, S, Freemark M. Pathogenesis and prevention of type 2 diabetes: parental determinants, breastfeeding, and early childhood nutrition. *Curr Diabetes Rep*. 2012;12(1):82-7.
- Bauer KW, Berge JM, Neumark-Sztainer D. The importance of families to adolescents' physical activity and dietary intake. *Adolesc Med State Art Rev*. 2011;22(3):601-13, xiii.
- Berg A. [New prevention program in obesity. When one becomes mobile then the pounds tumble too]. *MMW Fortschr Med*. 2003;145(51-52):11.
- Beyerlein A, von Kries R. Breastfeeding and body composition in children: will there ever be conclusive empirical evidence for a protective effect against overweight? *Am J Clin Nutr*. 2011;94(6S):1772S-75.
- Bohme MWJ, Schmolz GKK, Bohm BO. Pravention von Typ-2-Diabetes im Rahmen der Gesundheitsstrategie Baden-Wuerttemberg Eine Einfuhrung [Prevention of type 2 diabetes within the framework of the health strategy of Baden-Wuerttemberg]. *Diabetes Aktuell*. 2011;9(8):337-9.
- Bolssonneault GA, Essary AC, Brenneman AE, et al. Childhood obesity: screening and early intervention. *JAAPA* 2011;24(9):24-27.
- Bonsergent E, Briancullon S, Agrinier N, et al. Effectiveness of three overweight and obesity prevention strategies in high school adolescents: The PRALIMAP trial. *Can J Diabetes*. 2011;35(2):163.
- Booker JM, Schluter JA, Carrillo K, et al. Quality improvement initiative in school-based health centers across New Mexico. *J Sch Health*. 2011;81(1):42-8.
- Borys JM, Le Bodo Y, Walter L. EPODE European network: key recommendations for the setting of community-based interventions aimed at preventing childhood obesity. *Obes Rev*. 2011;12:6.
- Borys JM, Walter L, Du Plessis H, et al. Lessons of the epode European network (EEN) for the prevention of childhood obesity through community-based interventions. *Obes Facts*. 2012;5:67-8.
- Boyland EJ, Halford JC. Television advertising and branding: effects on eating behaviour and food preferences in children. *Appetite*. 2012;[Epub ahead of print].

- Branscum, P, Sharma M. After-school based obesity prevention interventions: a comprehensive review of the literature. *Int J Environ Res Public Health*. 2012;9(4):1438-57.
- Bratina N, Hadzic V, Batellino T, et al. Slovenske smernice za telesno udejstvovanje otrok in mladostnikov v starostni skupini od 2 do 18 let [Slovenian guidelines for physical activity in children and adolescents in the age group 2-18 years]. *Zdravniški Vestn*. 2011;80(12):885-96.
- Brownell KD, Wadden TA, Foster GDA. comprehensive treatment plan for obese children and adolescents: Principles and practice. *Pediatrician*. 1984-85;12(2-3):89-96.
- Brug, J. Childhood obesity prevention in Europe: the science of behaviour change. *Australas Med J*. 2011;4(12):715.
- Bruney TS. Childhood obesity: Effects of micronutrients, supplements, genetics, and oxidative stress. *J Nurse Pract*. 2011;7(8):647-63.
- Buonani C, Fernandes RA, Silveira LS, et al. Prevencao da síndrome metabolica em crianças obesas: Uma proposta de intervencao [Prevention of metabolic syndrome in obese children: a proposal of intervention]. *Rev Paul Pediatr*. 2011;29(2):186-92.
- Cabodi J, Kelsberg G, Safranek S. Clinical inquiry: does brief physician counseling promote weight loss? *J Fam Pract*. 2011;60(9):548-50.
- Cardon, G. Physical activity interventions in children. *Obes Rev*. 2011;12:17.
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## Study includes only overweight or obese children

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# Appendix E. Evidence Tables

## Key Question 1. School-based only

Evidence Table 1. Study characteristics for studies taking place in a school only setting.

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Amaro, 2006 <sup>1</sup>  Italy	NR	Randomized intervention	NR	No/Not reported	
Barbeau, 2007 <sup>2</sup>  US	NR	Randomized intervention	Girls only Age: >8 - <12 Grade: 3-5 Black, non-Hispanic Weight <300 lbs. Not taking any medications known to affect body composition or fat distribution. Able to participate in regular physical activity (PA).	No/Not reported	Subjects were recruited from 8 local elementary schools using fliers.
Bronikowski, 2011 <sup>3</sup>  Poland	NR	Randomized intervention	No inclusion/exclusion criteria were explicitly described. However, when describing the pre- and post-testing procedure the study indicates that pre-testing was done at the beginning of the year (when students were aged 13) and post-testing was done 3 semesters later (when students were 14.5 years) (p. 707).	No/Not reported	
Bruss, 2010 <sup>4</sup>  Commonwealth of the Northern Mariana Islands (CNMI), a US Commonwealth in the western Pacific	2006-2007	Randomized intervention	Grade: 3	Yes	The study population consisted of 3rd grade children and their caregivers attending all 12 public schools in the Commonwealth of the Northern Mariana Islands (CNMI).

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Burguera, 2011 <sup>5</sup>  Spain	NR	Non-randomized Intervention	Grade: 7-9th  Students could not be members of any federated sport team or organized after-school sport activities.  They had to agree to have two blood samples drawn (before and after the intervention) and plan to complete the school year in the same high school.	Yes	The grades involved in the study were 1st, 2nd and 3rd grade of ESO (Obligatory Secondary School of Spain) which correspond to 7th, 8th, 9th grade in the USA.
Bush, 1989 <sup>6</sup>  US	1983	Randomized intervention	Grade: 4-6 The study is being conducted in Washington, DC, where students who were attending grades 4-6 at nine public elementary schools in 1983 were eligible to participate.	No/Not reported	The schools were ranked according to the percentage of students eligible for Title I (federal school lunch program), and the rank order was divided into tertiles. Three schools were then randomly selected from each of these socioeconomic levels and randomly assigned either to the control condition or to one of two intervention conditions.
Chiodera, 2008 <sup>7</sup>  Italy	NR	Single arm pre-test/post-test design	BMI: < 30 Absence of major pathologies  No prolonged pharmacological therapy during the study period.  No involvement in a structured physical activity program outside the school.	No/Not reported	Children aged 6–10 years, from 24 primary schools located in the metropolitan area of Parma, Italy were included.
Coleman, 2011 <sup>8</sup>  US	NR	Randomized intervention	Grade: 2,3 and 6  Parental consent	No/Not reported	The total follow-up is over 3 years, but there is an entire year of baseline before the groups are randomized to intervention or control groups.  School-wide study
Damon, 2005 <sup>9</sup> Austria	NR	Non-randomized intervention	NR	Yes	
DeBar, 2011 <sup>10</sup>	2006	Randomized intervention	Grade: 6  No conditions that would hinder active participation in PE class.	No/Not reported	Major inclusion criteria for schools were at least 50% of children eligible for federally subsidized, free, or reduced priced meals and/or at least 50% of students whose ethnicity was Black or Hispanic.

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Donnelly, 2009 <sup>11</sup>  US	NR	Randomized intervention	Grade: 2-3 Schools were the unit of randomization. Students in the respective grades (2 & 3 at baseline and 4& 5 at the end of the study) in the schools randomized to PAAC participated in PAAC since it was adopted as a curriculum	Yes	
Foster, 2010 <sup>12</sup> Hirst, 2009 <sup>13</sup>  U.S.	NR	Randomized intervention	at least 50% minority (African American, Hispanic/Latino and/or American Indian) and/or greater than 50% eligible for free or reduced lunch. 50% of children in the school needed to be eligible for federally subsidized lunches; 50% of the students had to be black or Hisapnic	Yes	
Fung, 2012 <sup>14</sup>  Canada	NR	Natural experiment	Grade: 5  Intervention group: attend APPLE school.  Control group: students from 1/150 randomly selected non-APPLE schools from Alberta.	Yes	
Gortmaker, 1999 <sup>15</sup>  US	1995	Randomized intervention	NR	Yes	Ten schools from four communities in the Boston, MA metropolitan area were recruited to participate in the study based on their willingness to implement the classroom and physical education interdisciplinary curriculum, a multiethnic student population, and cooperation with random assignment of schools to the intervention or control condition. The participating children were in 6th and 7th grade.
Graf, 2008 <sup>16</sup>  Germany	NR	Randomized intervention	Grade: primary school	Yes	Also of relevance: 15 children were excluded because they took part in other programs for overweight and obese primary school children.
Gutin, 2008 <sup>17</sup>  US	2003	Randomized intervention	Grade: 3	Yes	For intended follow-ups, the baseline and follow-up were 2 complete years and 1 school year apart. One school year is approximately 8 months, and therefore 32 month follow-up (12*2+8) is approx. 138 weeks.
Haerens, 2006 <sup>18</sup>	NR	Randomized intervention		No/Not reported	A random sample of 15 schools of the 65 schools with technical and vocational education

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Belgium					in West-Flanders (Belgium) was selected to participate in this study.
Heelan, 2009 <sup>19</sup> US	NR	Non-randomized intervention	NR	No/Not reported	
Howe, 2011 <sup>20</sup> US	NR	Randomized intervention	Boys only  Age: 8-12 years old  Grades: 3-5  Black, non-Hispanic  (1) weigh <300 lbs. (equipment limitation). (2) not taking any medications known to affect metabolism, body composition, or fat distribution (e.g., Ritalin or Concerta). (3) Have no known CV, metabolic, or respiratory disease or physical impairment that would limit their participation in regular PA.	Yes	Only 1 sibling per family was included in the analysis.
James, 2004 <sup>21</sup> England (UK)	NR	Randomized intervention	Age: >7 - <11 Parents consented and had to return parental consent forms	Yes	
James, 2007 <sup>22</sup> England (UK)	2001-2001	Randomized intervention	Age: >7 - <11 Grade: junior high school.	Yes	The original follow-up period for the original study was 12 months. Two years after completion of the intervention one of the authors took additional longitudinal measurements.
Kafatos, 2005 <sup>23</sup> Greece	1992-1992	Randomized intervention	Grade: 1 The population of the intervention group was comprised by the total number of children registered in the first grade in two counties of the island of Crete while those registered in a third county served as the control group.	No/Not reported	The study states, "The current study examines the long-term effects of a school-based 'Health and Nutrition Education program' on body mass index (BMI) changes and the prevalence of overweight.  It is not clear to me whether this is a randomized intervention. The methods state, 'For evaluation purposes, a random sample of

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
					24 schools (602 pupils and their parents) in the intervention counties and 16 schools (444 pupils and their parents) in the control county were selected for comparative purposes.
Kain, 2009 <sup>24</sup> Chile	2003-2005	Non-randomized intervention	Grade: 1st to 8th Limited entry to children starting at 7th grade.	Yes	There were 3 intervention schools representing the totality of the primary school population (1st to 8th grade) enrolled in public education in Casablanca, but only 1 control school in Quillota.
Klish, 2012 <sup>25</sup>		Randomized intervention			
Lazaar, 2007 <sup>26</sup> France	NR	Randomized intervention	Grade: 1,2 Eligible children must meet the following: elementary schools (first and second grades of elementary school), participating in the scheduled school physical education (SPE) classes, participating in less than 3 h of extra school sports activity per week, free of any known disease and not participating in other studies.	No/Not reported	
Llargues, 2012 <sup>27</sup> Spain	2008	Randomized intervention	Age: 5-6 years old,  Grade: First year school children  Children born in 2000 attending public schools and state assisted schools in Granoller. School children who do not need a special diet (for metabolic or digestive disorder), without physical activity incapacity, with family acceptance or attendance to school.	Yes	Major inclusion criteria being children born in 2000 and attending schools in Granoller
Lubans, 2012 <sup>28</sup> Australia	NR	Randomized intervention	Boys only  Grade: 9  English	Yes	
Lubans, 2012 <sup>29</sup> Australia	NR	Randomized intervention	Girls only  Grade: 8th grade  Schools from which girls were recruited were considered	Yes	

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
			eligible for study inclusion if the Socio-Economic Index for Areas score was 5 or less (bottom 50%) - this intervention targeted girls living in low income communities.		
Madsen, 1993 <sup>30</sup> US	NR	Randomized intervention	Grade: 5th-6th Individuals with no indication of high blood pressure, pre-existing cardiovascular disease, or high total cholesterol were also included.	No/Not reported	Census track data were used to identify schools (to recruit from) with large numbers of Mexican-American or Anglo-American families of lower socioeconomic status.
Magnusson, 2012 <sup>31</sup> Iceland	Fall 2006	Randomized intervention	Age: born in 1999	Yes	
Manios, 1999 <sup>32</sup> Greece	NR	Non-randomized intervention	Grade: 1st Participants in the intervention group are students from two counties in Crete (Heraklio and Rethimno) while the students in the control group are from Hania.	No/Not reported	This article is one of the multiple articles from the Creten health education program study(refid 31552, 13261, 13152, 43363 and 8531).
Manios, 2002 <sup>33</sup> Greece	1992-1992	Non-randomized intervention	Grade: 1st Participants in the intervention group are students from two counties in Crete (Iraklio and Rethimno) while the students in the control group are from Hania.	No/Not reported	
Manios, 2006 <sup>34</sup> Greece	1992 from refid 43363	Non-randomized intervention	NR	No/Not reported	The population of the intervention group (IG) comprised of children registered in the first grade of primary schools.
Muckelbauer, 2009 <sup>35</sup> Germany	NR	Randomized intervention	Schools were eligible for participation if they were located in deprived areas, as defined with the following criteria: unemployment rate of $\geq 15\%$ , proportion of social welfare recipients of $\geq 5\%$ , and proportion of non-German residents of $\geq 5\%$ , as indicated by the local public authorities. Schools must also meet technical requirements for the installation of the water fountain and agree to participate in the study.	Yes	This is a randomized, controlled cluster trial with 1 intervention arm and 1 control arm which considered schools as cluster units of intervention.
Neumark-Sztainer, 2010 <sup>36</sup> US	NR	Randomized intervention	Girls only Not engaged in high levels of physical activity. No eating disorder.	Yes	
Newton, 2010 <sup>37</sup>	NR	Non-randomized	NR	Yes	This particular study was a pilot study of the randomized controlled trial, entitled Wise Mind

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
US		intervention			
Reed, 2008 <sup>38</sup> Canada	2003-2003	Randomized intervention	Grade: 4-5 No health condition that could affect normal physical activity or development.	No/Not reported	
Rosario, 2012 <sup>39</sup> Portugal	2007-2008	Randomized intervention	Public elementary schools, Parents provided informed consent.	Yes	Seven out of 80 public elementary schools randomly selected and invited to take part in study. Three schools were randomized to intervention and four to control group.
Rush, E, 2012 <sup>40</sup> New Zealand	2004-NR	Randomized intervention	Age: 5-10 years old	Yes	
Sahota, 2001 <sup>41</sup> UK	NR	Randomized intervention	NR	Yes	
Sallis, 1993 <sup>42</sup> US	1990	Other: At first randomized, but a third school was added to the control	Grade: 4	Yes	Within strata, six schools were randomly assigned to the three experimental conditions. A third school was added to the control condition, because controls were felt to have the least incentive for staying in the study.
Salmon, 2008 <sup>43</sup> Australia	NR	Randomized intervention	Grade: 5 Children attending schools in low SES areas were selected.	Yes	
Skybo, 2002 <sup>44</sup> US	1999	Quasi- experimental	Grade: 3 Language: English: Participants had parental consent; the student had at least one parent who was involved in the study; student assented to participate.	No/Not reported	
Smolak, 2001 <sup>45</sup> US	NR	Non- randomized intervention	Boys and girls ages 9–11	No/Not reported	
Sollerhed,	2000-2000	Non-	NR	Yes	

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
2008 <sup>46</sup> Sweden		randomized intervention			
Stenevi- Lundgren, 2009 <sup>47</sup> Sweden	1999-1999	Non- randomized intervention	Girls only Grade: 1 and 2  All participants were healthy Caucasian girls not taking any medication known to influence bone or muscle metabolism, although I don't think this was an inclusion criteria, per se.	No/Not reported	
Stock, 2007 <sup>48</sup> Canada	NR	Non- randomized intervention	Selection of the 2 schools {elementary} was based on expressed interest and school district superintendent support. The intervention school was selected because it had an even number of classes, which made buddy pairing more efficient for this pilot study.	Yes	Kindergarten-3rd grade and 4th-7th grades had different roles in the intervention depending on the student's grade level - that is, the older children were mentors (healthy buddies) to the younger children
Taylor, 2007 <sup>49</sup> New Zealand	2003-2005	Non- randomized intervention	NR	Yes	Children aged 5 to 12 years attending primary schools.
Thivel, 2011 <sup>50</sup> France	2003-2003	Randomized intervention	Age: >6 - <10 (1) being in the first or second grades, (2) taking part in the standard physical education classes offered by the school, (3) not participating in more than 3 h of extracurricular sports activity per week, (4) being free of any known disease, and (5) not being involved in any other study.	No/Not reported	Participating children were considered obese if their BMI reached the 97th percentile according to the national reference curves developed by Roland-Cachera et al. (1991) [33]. The interventional group included 60 obese children compared to 41 obese children in the control group
Treveno, 2005 <sup>51</sup> US	1998-1999	Randomized intervention	Grade: 4th grade Participants had to be enrolled in elementary schools in low-income inner-city neighborhoods.	No/Not reported	The schools selected were in the same geographic region of the city and were the feeder schools to three middle schools and one high school. Schools chosen were majority Mexican American (97%) and qualified for food assistance programs in the elementary schools (95%).
Tucker, 2011 <sup>52</sup> US	NR	Quasi- experimental	Children of varying heights and weights were recruited from two elementary schools Elton Hills Elementary School (EHS)and Harriet Bishop Elementary School (HBS).	No/Not reported	
Valdimarsson,	NR	Non-	Girls only	No/Not reported	Controls were selected from three neighboring



Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
2006 <sup>53</sup> Sweden		randomized intervention	Grade: 1 and 2		schools were intervention participants were selected from one school.
Vandongen, 19 95 <sup>54</sup> Australia	1990-1990	Randomized intervention	Grade: Year 6	No/Not reported	30 total schools were enrolled into the study. Each school was assigned to 1 of 5 SES strata. The six schools within each stratum were then allocated into six arms.
Viskic-Stalec, 2007 <sup>55</sup> Croatia	NR	Non- randomized intervention	Girls only Age: >16 - <18 Grade: 3-4 Healthy children.	No/Not reported	
Vizcaino, 2008 <sup>56</sup> Spain	NR	Randomized intervention	NR	Yes	Participating children were free of serious learning difficulties or physical or mental disorders that could impede participation in scheduled physical activities.
Walter, 19 85 <sup>57</sup> US	NR	Randomized intervention	Grade: 4 Students in all 22 elementary schools in a single district.	No/Not reported	1 year follow up results have been presented of a 5 year long study.
Walther, 2009 <sup>58</sup> Germany	NR	Randomized intervention	Grade: 6 Study selection was based on the willingness of parents to allow their children to participate in the study protocol for at least 1 year	No/Not reported	
Warren, 2003 <sup>59</sup> UK	2000	Randomized intervention	Age: > 5years < 7years Grade: Primary school year 1-2 The primary schools were selected on the basis of previous links to the Nutrition and Food Science Department at Oxford Brookes University and their close proximity to the University.	Yes	

APPLE = Alberta Project Promoting active Living and healthy Eating; BMI = Body Mass Index; CNMI = Commonwealth of the Northern Mariana Islands; EHS = Elton Hills Elementary School; ESO = Obligatory secondary School of Spain; HBS = Harriet Bishop Elementary School; IG = Intervention group; NR = Not reported; PA = Physical Activity; PAAC = Physical Activity Across the Curriculum; SES = Socioeconomic status; SPE = School Physical Education; UK = United Kingdom

**Evidence Table 2. Participant characteristics for studies taking place in a school only setting**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Amaro, 2006 <sup>1</sup>	241	24 weeks	Arm1: 33 Arm2: 75	Range: 11-14 Arm1: 12.5 (0.7) Arm2: 12.3 (0.8)	White, non-Hispanic Overall: 241 (100) Arm 1: 88 (100) Arm 2: 153 (100)	Middle school Overall: 241 (100)	
Barbeau, 2007 <sup>2</sup>	201	43 weeks	Arm1: 83 (100) Arm 2: 118 (100)	Arm1: 9.5 Arm 2: 9.5	Black, non-Hispanic Arm 1: 83 (100) Arm 2: 118 (100)	elementary school Arm 1: 83 (100) Arm 2: 118 (100)	Sexual maturation in the two groups: 2.6 vs. 2.4 Tanner stage for breast development in Arm 1 (control) and Arm 2 (intervention), respectively.
Bronikowski, 2011 <sup>3</sup>	137	130 weeks	NR	Arm1:13.25 (0.40) Arm2:13.22 (0.29)	NR	NR	
Bruss, 2010 <sup>4</sup>	407	52 weeks	Overall: 205 Arm1: NR Arm2: 205	Overall: 8.55 (0.51)	Asian/Pacific Islander Overall: (100) Arm 1: (100)  Mother's ethnicity Pacific Islander: 56.69% (216/381) Asian: 43.31% (165/381)  Father's ethnicity Pacific Islander: 56.0% (214/382) Asian: 44.0% (168/382)	Grade 3 Overall: 402 Arm 1: NR Arm 2: 402	Children in the “enrolled population” were placed in three groups based on number of lessons attended by their caregivers (0, 1–4, 5–8) and Compared (Table 2). Children of caregivers who completed 5–8 lessons were referred to as “completers” and were categorized into Fall and Spring Groups based on when the caregiver participated in the intervention sessions. Crossover analysis was performed on the “completers” who had complete BMI data at all three data collection points (n = 122, Figure 1) focusing on intervention effects for the “completers” and the primary outcome measure of change from baseline in BMI z-score (26).
Burguera, 2011 <sup>5</sup>	90	26 weeks	Overall: 59.7	Overall: 13.9 (1.1)	NR	NR	
Bush, 1989 <sup>6</sup>	1041	104 weeks	Overall: (54)  Compared to the intervention group, more boys were in the control (numbers not reported.)	Overall:10.5  Compared to the intervention group, older children were in the control (numbers not reported.)		NR	1,041 (84.4 per cent) participated in the baseline examination of risk factors; 431 (41.4 per cent) were available for rescreening after two years of intervention, forming the cohort. 36.4% were in the low socio-economic status group, 28.6% were in the middle socio-economic status group, and 35.0% were in the high socio-economic status group. More low socio-economic status children were in the control group.
Chiodera, 2008 <sup>7</sup>	4500	34 weeks	Overall: 2293 Arm1: NR Arm2: 2293	Overall: 6-10 Arm1: NR Arm2: 6-10		Primary School Overall: 4500 (100) Arm 1: NR Arm 2: 4500 (100)	

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Coleman, 2011 <sup>8</sup>	NR	104 weeks	Overall: (57)	Overall:8.9 (1.6)	White, Non-Hispanic/ Overall: (19)  Black, Non-Hispanic Overall: (19)  Latin/Hispanic/ Overall: (52)  Islander Overall: (7)  Unknown Overall:(2.7)	NR	N not stated but calculated from the statement "Baseline height and weight were collected for 444 second and third grade and 135 sixth grade students. Intervention group children had higher BMI Z scores ( $0.86 \pm 1.03$ ) at baseline than control group children [ $0.68 \pm 1.10$ ; $t(577) = 2.06$ ; $p = .04$ ].
Damon, 2005 <sup>9</sup>	491	43 weeks	NR	Overall: 10-12	NR	1st grade Overall: 491 (100)	
DeBar, 2011 <sup>10</sup>	4603	104	Overall: NR Arm1: (46.5) Arm2: (58.6) Arm3: (49.3)	Overall: NR Arm1: 11.3 (0.5) Arm2: 11.2 (0.5) Arm3: 11.3 (0.5)	White, non-Hispanic Arm1: (21.6) Arm2: (18.6) Arm3: (16.2)  Black, Non-Hispanic Arm1: (15.7) Arm2: (22.5) Arm3: (19.1)  Latino/Hispanic Arm1: (53.5) Arm2: (51.0) Arm3: (57.0)  American Indian/Alaska Native Arm1: (9.2) Arm2: (7.9) Arm3: (7.7)	NR	
Donnelly, 2009 <sup>11</sup>	1527	156 weeks	Overall: (51.7)	NR	White, non-Hispanic Overall: (77.4)	NR	43% qualified for free or reduced lunch. Baseline BMI for the PAAC schools was $17.9 \pm 3.1$ and $18.0 \pm 3.7$ for control schools (NS).

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
					Black, non-Hispanic Overall: (6.2)  Latino/Hispanic Overall: (10.1)  Asian/Pacific Islander Overall: (1.2)  American Indian/Alaska Native Overall: (1.6)  Multi-ethnic Overall: (3.6)		
Fpster, 2012 <sup>12</sup>	4603	156	(52.3)	11.3 (0.6)	Hispanic (52.4) Black (18) White (19.3) Other (8.5)	6	
Fung, 2012 <sup>14</sup>	NR	104 weeks	Arm1:50.7 Arm2:48.5	NR		Grade: 5 Overall: (100)	Baseline data. Follow-up data is on different students (different students replied to the survey in the schools and some of the provincial schools were changed), so demographic data is different.
Gortmaker, 1999 <sup>15</sup>	1295	104 weeks	Arm1: 317 (48) Arm2: 310 (48)	Arm1:11.7 (0.7) Arm2:11.7 (0.7)	White, non-Hispanic Arm 1: 63 Arm 2: 69  Black, non-Hispanic Arm 1: (15) Arm 2: (11)  Latino/Hispanic Arm 1: (16) Arm 2: (11)  Asian/Pacific Islander Arm 1: (7) Arm 2: (9)  American Indian/Alaska Native	NR	

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
					Arm 1: (2) Arm 2: (2)  Unspecified Arm 1: (9) Arm 2: (5)		
Graf, 2008 <sup>16</sup>	615	208 weeks	Overall: (48.9)	Overall: 6.8 (0.4) Arm1: 7.2 (0.4) Arm2: 6.7 (0.4)  For data on Age: N for Arm 1 is 178 N for Arm 2 is 433		Primary School Overall: (100)	Data reported here is only for those children who took part in the entrance and final examinations. Children's height at baseline was 25.0 kg (SD=4.7), and height was 1.24 m (SD=0.06). P for group difference b/w height was P<0.001 and for body mass was 0.001.
Gutin, 2008 <sup>17</sup>	210	138 weeks	Arm1: (53) Arm2: (54)  For the >40% intervention group, 47% were girls. Here, ">40%", refers to those with >40% attendance for exposure to the intervention for each of the 3 years.	Overall: 8.5 (0.6)	Black, non-Hispanic Arm 1: (59) Arm 2: (67)  For the >40% intervention group, 80% were black	Grade 3 Overall: (100)	A total of 617 students (age=8.5 years, standard deviation, SD=0.6) consented to participate. Data analyses were performed on 206 youths "who remained in the same schools for the 3-year period, who were measured at all six time points and, for the intervention group, who attended at least 40% of the sessions in each of the 3 years."
Haerens, 2006 <sup>18</sup>	2840	95 weeks	Overall: (36.6) Arm1: (58.8) Arm2: (15.6) Arm3: (40.1)  Sex differs by group with arm 2 having least percentage of female participants.	Overall: 13.06 (0.81) Arm1: 12.85 (0.71) Arm2: 13.24 (0.87) Arm3:13.04 (0.79)		Grade 7 <sup>th</sup> -8 <sup>th</sup> Overall: (100) Arm 1: (100) Arm 2: (100) Arm 3: (100)	The parents of 151 (5%) children did not give permission for their child to participate in this study. This resulted in a sample of 2840 11- to 15-year-old boys and girls within 15 schools. This fact explains why the total number of participants in all arms (2991) did not equal total N at baseline (2840).
Heelan, 2009 <sup>19</sup>	324	78 weeks	Arm1: 73 Arm2: 106	Arm1: 8.4 (1.6) Arm2: 8.1 (1.7)		1 <sup>st</sup> -5 <sup>th</sup> Arm 1: 123 Arm 2: 201	Note that the data reported above in this form is only for those individuals who were recruited to participate in a more detailed measurement protocol to evaluate outcomes.  Participants' socioeconomic status (judged by

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
							percentage of youth qualifying for free and reduced lunches) was equivalent across schools (approximately 30%).  IMPORTANT: Each elementary school had approximately 220 children in kindergarten through fifth grade, and all students in first through fifth grade in the 3 participating schools were invited to participate in the study. Specifically, the two WSB schools had 464 school children in total while the control school has 227. Approximately 26% of WSB school children and 28% of control school children actively commuted to school at least once a week, whereas 34% of WSB and 35% of control school children actively commuted home from school at least once a week.
Howe, 2011 <sup>20</sup>	106	40 weeks	NR	Arm1:9.9 (0.2) Arm2:9.7(0.2) Arm3:9.8(.2)	Black, Non-Hispanic Overall:106 (100) Arm1:44(100) Arm2:31(100) Arm3:31(100)	Grade:3-5 Overall: 106 (100)	
James, 2004 <sup>21</sup>	644	52 weeks	Arm1: 164 Arm2: 156	Overall: 8.7 (0.9) Range: 7.0-10.9		NR	Sample size here was that during group assignment.
James, 2007 <sup>22</sup>	644	39 weeks	Overall: 321	NR		NR	This study was the 2-year follow-up results of a previous study. They did not report the original baseline characteristics in this study; they only reported the characteristics of the children with 2-year follow-up data (N=434).
Kafatos, 2005 <sup>23</sup>	541	312 weeks	NR	NR		NR	There is no baseline data in this paper; only data for whom there was data for all 3 examinations periods. Baseline data is probably available in parent paper, published earlier. The Methods state, 'The data presented in the current paper are based on those pupils having full data in all three examination periods (284 pupils from the intervention schools and 257 from the control schools).'
Kain, 2009 <sup>24</sup>	2430	314	Overall: 942 Arm1: 225 (39.3) Arm2: 717 (48.9)	Arm1: 9.9 (2.1) Arm2:10.0 (2.3)		NR	To assess the effectiveness of the intervention according to the mode delivered, we divided the 21 months observation time (March 2003 to November 2004) into three different periods: (i) period 1, first school year (full intervention), lasting from March to November 2003; (ii) period 2, December 2003 to March 2004, summer

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
							recess (children received no intervention); and (iii) period 3 or the second school year (partial intervention, March to November 2004).
Klish, 2012 <sup>25</sup>	NR	NR	NR	NR	NR	NR	
Lazaar, 2007 <sup>26</sup>	425	26 weeks	Overall: 213	Overall: 7.4 (0.8)		NR	The structure of four groups (GIOb, GINo, GCOB and GCNo) was almost identical with regard to the ages of the children and their gender distribution. Moreover, there were no significant differences with regard to the average age of children and the BMI profile distribution between girls and boys.
Llargues, 2012 <sup>27</sup>	509	208 weeks	Arm1⊗45.6) Arm2⊗46.3)	Overall: 6-8 years	NR	NR	
Lubans, 2012 <sup>28</sup>	100	24 weeks	NR	Overall:14.3 (0.6)	NR	Grade: Grade 9 Overall: (100)	Study design and participant allocation found in separate report. Lubans, DR. "Randomized controlled trial of the Physical Activity Leaders (PALs) program for adolescent boys from disadvantaged secondary schools". Prev Med 2011 v52
Lubans, 2012 <sup>29</sup>	357	52 weeks	Overall⊗100) Arm1⊗100) Arm2⊗100)	Overall:13.8 (0.45) Arm1:13.20 (0.45) Arm2:13.15 (0.44)	Australian Overall:305 (85.4) Arm1:153 (85.5) Arm2:152 (85.4)  Asian Overall:4(1.1) Arm1:1(0.6) Arm2:3(1.7)  European Overall:36 (10.1) Arm1:18 (10.1) Arm2:18 (10.1)	Grade:8 <sup>th</sup> grade Overall: (100)	
Madsen, 1993 <sup>30</sup>	314	104 weeks	Arm1: NR Arm2: 78 (48)	Arm1: NR Arm2: 12.1 (1.8)		Grade 5-6 Arm 1: NR Arm 2: 162	Total N (including control group) is not reported in this article because no data on original control group is included in this article. Further information may be available in referenced article in study characteristics form.
Magnusson, 2012 <sup>31</sup>	266	NR	Arm1:60 Arm2:51	Arm1:7.4(0.3) Arm2:7.3(0.3)	White, Non-Hispanic Overall: (97)	NR	

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Manios, 1999 <sup>32</sup>	1046	156 weeks	NR	NR		NR	This article is one of the multiple articles from the Creten health education program study <sup>32-34,60,61</sup> .
Manios, 2002 <sup>33</sup>	1046	312 weeks	Overall: 500	NR		NR	This article is one of the multiple articles from the Creten health education program study <sup>32-34,60,61</sup> .
Manios, 2006 <sup>34</sup>	441	312 weeks	NR	NR		first grades Overall: 441 (100)	This article is one of the multiple articles from the Creten health education program study <sup>32-34,60,61</sup> .
Muckelbauer, 2009 <sup>35</sup>	3190	NR	Arm1: (49.7) Arm2: (49.8)	Arm1: 8.34 (0.76) Arm2: 8.26 (0.73)		2 <sup>nd</sup> and 3 <sup>rd</sup> grades Overall: (100) Arm 1: (100) Arm 2: (100)	Of 3190 children screened at baseline, a total of 2950 children (92%) were also measured at the follow-up assessment and were considered for analysis. Baseline data is only reported for participants who were present at baseline assessment and at follow-up assessments. There is no report of baseline data for all individuals present for baseline assessments.
Neumark-Sztainer, 2010 <sup>36</sup>	356	36-52 weeks	Overall: 356 (100)	Overall: 15.8 (1.17) Arm1: 15.8 (1.22) Arm2: 15.7 (1.13)	White, non-Hispanic Overall: 87 (24.4) Arm 1: 38 (21.8) Arm 2: 49 (26.9)  Black, non-Hispanic Overall: 101 (28.4) Arm 1: 42 (24.1) Arm 2: 59 (32.4)  Latino/Hispanic Overall: 51 (14.3) Arm 1: 27 (15.5) Arm 2: 24 (13.2)  Asian/Pacific Islander Overall: 82 (23.0) Arm 1: 52 (29.9) Arm 2: 30 (16.5)  American Indian/Alaska Native Overall: 9 (2.5) Arm 1: 3 (1.7) Arm 2: 6 (3.3)	NR	



Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
					Mixed Overall: 26 (7.3) Arm 1: 12 (6.9) Arm 2: 14 (7.7)		
Newton, 2010 <sup>37</sup>	77	78 weeks	Overall: (50) Arm1: NR Arm2: (50)	Overall: 9.26 Arm1: NR Arm2: 9.26	Black, non-Hispanic Overall: 77 (100) Arm 1: Arm 2: 77 (100)	Grades 2-6 Overall: 77 (100) Arm 1: Arm 2: 77 (100)	
Reed, 2008 <sup>38</sup>	268	NR	NR	NR		NR	The baseline stage of the study (Phase 1) was conducted from April-June 2003 (when baseline measurements were taken). The active phase of the intervention (Phase II) was conducted between September 2003 and May 2004).
Resaland, 2011 <sup>62</sup>	256	104 weeks	NR	Arm1:9.2(0.3) Arm2:9.2(0.3)	NR	NR	
Rosario, 2012 <sup>39</sup>	464	24 weeks	Overall:51.5 Arm1:52.8 Arm2:50.2 Arm3: NR	Overall: 8.3(1.2) Arm1:8.2(1.2) Arm2:8.3(1.2)	NR	NR	Also reported on other baseline characteristics: mother's education, father's education, BMI (mean 17.9; SD 2.7).
Rush, 2012 <sup>40</sup>	NR	104 weeks	Overall:50.2 Arm1:50.7 Arm2:51	NR	European Overall⊗67.3) Arm1⊗65.0)  Maori Overall⊗25.7) Arm1⊗25.9)  Others Overall⊗7) Arm1⊗8.4)	NR	#s at baseline, intervention, control does not add up, but I recorded as reported in the article.
Sahota, 2001 <sup>41</sup>	636	NR	NR	Arm1: 8.4 (0.63) Arm2: 8.3 (0.63)		Grades 4-5 Overall: 636 Arm 1: 322 Arm 2: 314	
Sallis, 1993 <sup>42</sup>	549	NR	Overall: 244 Arm1: 97 Arm2: 87 Arm3: 60	Overall: 9.25 (0.5)	White, non-Hispanic Overall: (85)  Black, non-Hispanic Overall: (1)	Grade 4 Overall: (100)	Anthropometric evaluations were completed on 740 children, and surveys were completed by 745 students at baseline. Complete data for all four measures were available on up to 305 boys and 244 girls who are subjects in the present report. Those with complete data added up to be 549.

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
					Latino/Hispanic Overall: (7)  Asian/Pacific Islander Overall: (6)  Unidentified Overall: (1)		
Salmon, 2008 <sup>43</sup>	306	39 weeks	Overall: 156	NR		NR	Age was presented separately for boys and girls.
Skybo, 2002 <sup>44</sup>	58	39 weeks	Arm1: 15 Arm2: 13	NR	White, non-Hispanic Arm 1: (28) Arm 2: (51.5)  Black, non-Hispanic Arm 1: (40) Arm 2: (39.4)  Latino/ Hispanic Arm 1: (4) Arm 2: (3)  Unspecified Arm 1: (23) Arm 2: (6.1)	Grade 3 Overall: (100)	One student from each arm withdrew from the study explaining why total number of participants from both arms (56) is not equal to total N at baseline (58).
Smolak, 2001 <sup>45</sup>	509	104 weeks	Overall: 252	NR		Grade 6 Overall: 253  Grade 7 Overall: 241	There were no clear demographics reported for final numbers, either baseline or follow up.
Sollerhed, 2008 <sup>46</sup>	132	156 weeks	Overall: 59 Arm1: 23 Arm2: 36	Overall: Range 6-9 Arm1: Range 6-9 Arm2: Range 6-9		NR	
Stenevi-Lundgren, 2009 <sup>47</sup>	103	52-104 weeks  Control group was followed for 104 weeks.	Overall: 103 (100) Arm1: 50 (100) Arm2: 53 (100)	Arm1: 7.9 (0.6) Range (6.8– 8.9)  Arm2: 7.7 (6) Range (6.5–8.7)	White, non-Hispanic Overall:103 (100) Arm 1: 50 (100) Arm 2: 53 (100)	Grade1-2 Overall: 103 (100) Arm 1: 50 (100) Arm 2: 53 (100)	
Stock, 2007 <sup>48</sup>	360	43 weeks	Arm1: 33 (54) Arm2: 38 (54)	NR		Grade 7 Overall: (100)	

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
			Arm3: 64 (64) Arm4: 64 (50)				
Taylor, 2007 <sup>49</sup>	730	104 weeks	Overall: NR Arm1: 111 Arm2: 112	Arm1: 7.7 (1.6) Arm2: 7.7 (1.8)	White, non-Hispanic Overall: (81.8)  Asian/Pacific Islander Overall: (0.9)  Maori Overall: 17.3	NR	
Thivel, 2011 <sup>50</sup>	457	26 weeks	Overall: 228 Arm1: 112 Arm2: 117	Overall: Range 6-10 Arm1: Range 6-10 Arm2: Range 6-10		Grade 1-2 Overall: 457 Arm 1: 228 Arm 2: 229	
Trevino, 2005 <sup>51</sup>	387	34 weeks	Arm1: 94 (51) Arm2: 107 (55)	Arm1: 9.7 Arm2: 9.8		NR	495 students returned parental consents but only 387 students (78%) had completed both pre and post data collection. Groups were similar on household and education demographic characteristics. Median household income was \$11,691 (arm 1) and \$10,337 (arm 2); 69.4% (arm 1) and 71.8% (arm 2) had an education level less than a high school diploma.
Tucker, 2011 <sup>52</sup>	99	34 weeks	Overall: 99 Arm1: 33 Arm2: 66	Overall: 9.65	NR	Grade 4-5 Overall: 99 (100)	
Valdimarsson, 2006 <sup>53</sup>	103	52–104 weeks  The intervention students were followed up one year post enrollment and the control students were followed up two years post enrollment. Allowed 2-year follow-up controls since BMC and aBMD is found to increase over the	Overall: 103 (100) Arm1: 50 (100) Arm2: 53 (100)	Arm1: 7.9 (0.6) Arm2: 7.7 (0.6)		NR	Weight at baseline was 27.6 (kg; SD 5.5) for intervention students (arm 2) compared to 27.3 (kg; SD 5.5) for control students (arm 1).

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
		study span in a linear fashion.					
Vandongen, 1995 <sup>54</sup>	1147	39 weeks	Overall: 485 Arm1: 67 Arm2: 77 Arm3: 81 Arm4: 108 Arm5: 68	Overall: Range 10-12 Arm1: Range 10-12 Arm2: Range 10-12 Arm3: Range 10-12 Arm4: Range 10-12 Arm5: Range 10-12		year 6 Overall: (100) Arm 1: (100) Arm 2: (100) Arm 3: (100) Arm 4: (100) Arm 5: (100)	Number of participants per arm is only presented by specific variables – i.e. dietary variables, blood pressure, etc. It is not presented for overall sample per arm.
Viskic-Stalec, 2007 <sup>55</sup>	220	34 weeks	Overall: (100) Arm1: (100) Arm2: (100)	NR		NR	
Vizcaino, 2008 <sup>56</sup>	1044	36-72 weeks	Arm1: 310 (51.1) Arm2: 253 (49.3)	Arm1: 9.4 (0.6) Arm2: 9.4 (0.7)		NR	
Walter, 1985 <sup>57</sup>	1563	52 weeks	Overall: (48.6)	Overall: 9.1	White, non-Hispanic Overall: (24.6)  Black, non-Hispanic Overall: (48.9)  Latino/ Hispanic Overall: (23.2)  Primarily of Asian or Pacific origin Overall: (3.3)	4 <sup>th</sup> Grade Overall: (100) Arm 1: (100) Arm 2: (100)	
Walther, 2009 <sup>58</sup>	211	52 weeks	Arm1: (42) Arm2: (47)	Arm1: 11.1 (0.7) Arm2: 11.1 (0.7)		6 <sup>th</sup> Grade Overall: 211 (100) Arm 1: 73 (100) Arm 2: 109 (100) Arm 3: 29 (100)	188 students were randomized at baseline to intervention and control groups and 32 were selected none randomly as the reference group. Because of removals and dropout of schools (3 students in the intervention group and 3 students in the control group), 182 students were included for baseline and follow-up analysis (reported above) and 29 students from the reference group.
Warren, 2003 <sup>59</sup>	218	61-69 weeks	Overall: 107 Arm1: 25 Arm2: 25 Arm3: 27 Arm4: 30	Overall: 6.1 (0.6) Arm1: 6.1 (0.6) Arm2: 6.1 (0.6) Arm3: 6.1 (0.6) Arm4: 6.1 (0.7)		Years 1 and 2	

aBMD= areal bone mineral density; BMC= bone mineral content; BMI= Body Mass Index; N= Sample size; NR= Not reported; NS= Not significant; PAAC= Physical Activity Across the Curriculum; SD= Standard deviation; WSB= Walking School Bus

Evidence Table 3. Description of the interventions used in school only settings

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Amaro, 2006 <sup>1</sup>	2	<p>Kaledo educational board-game</p> <p>Length of intervention, weeks: 24</p> <p>Setting: School :Classroom based</p>	<p>Kaledo, an educational board-game that is designed to transfer knowledge about the healthy Mediterranean diet, in agreement with modern nutrition notions. A play session represents a journey through daily meals of the Mediterranean diet.</p> <p>Target:Child</p> <p>Delivery: Teacher</p> <p>Duration: 15-30 minutes per session.</p> <p>Frequency: One session per week for the subjects. Extra-play sessions for children that were absent during a session.</p> <p>Other: Requires 2-4 players.</p>		<p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 15-30 minutes per session.</p> <p>Frequency: One session per week for the subjects. Extra-play sessions for children that were absent during a session.</p> <p>Other: Requires 2-4 players.</p>			<p>Other:Parent notification of BMI screening (policy)</p> <p>Target: Child</p> <p>Delivery: District</p> <p>Duration: Each spring for 364 weeks (7 years).</p> <p>Comment: Mandatory school-based BMI screening with optional parent notification.</p>	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Barbeau, 2007 <sup>2</sup>	2	Physical Activity (PA) Length of intervention, weeks: 43 Setting: School		Homework time during which the subjects were provided with a healthy snack free of charge. All of the snacks were individually packaged, and every day the subjects had a choice of something salty (e.g., crackers and cheese), something sweet (e.g., low-fat cookies), or a fruit or vegetable. Subjects chose one snack, and were allowed to get another snack if they were still hungry after the first one. This intervention was administered for 30 minutes every day that school was in session.  Target: Child  Delivery: Teacher		A PA component that included 25 minutes of skills development (e.g., how to dribble a basketball), 35 minutes of moderate vigorous PA (MVPA), and 20 minutes of toning and stretching. Activities during the MVPA included games such as basketball, tag, softball, relay races, etc., all of which were modified to keep all of the subjects active throughout the 35-minute period. Participants wore Polar Accurex HR Monitors to help them maintain their HR above 150 bpm during the MVPA portion. HR was also monitored to help provide feedback to subject struggling to maintain this goal. Prizes were awarded for good behavior as a way of rewarding good behavior, participation, and effort. Attendance was kept and parents			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
				Other: Teaching assistant, research staff person on-site		<p>of students who had two unexcused absences in a row were encouraged to send their daughter back to the program.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Other: Teaching assistant, research staff person on-site</p> <p>Duration: 80 minutes every day that school was in session, including 25 mins of skills development, 35 mins of MVPA, and 20 mins of toning and stretching.</p>			
Bruss, 2010 <sup>4</sup>	2	<p>PFGM, cognitive behavioral lifestyle intervention</p> <p>Length of intervention, weeks: 36</p> <p>Setting: School</p>	<p>The curriculum was divided into eight different 90-min sessions focused on the following topics:</p> <p>(i) promoting physical activity, (ii) recognizing and reducing sedentary activities, (iii) preserving self-esteem, (iv) weight normalcy and energy balance, (v)</p>		<p>The curriculum was divided into eight different 90-min sessions focused on the following topics:</p> <p>(i) promoting physical activity, (ii) recognizing and reducing sedentary activities, (iii) preserving self-esteem, (iv) weight normalcy and energy balance, (v) healthy eating environment, (vi) maintaining</p>			<p>Pedometer Target: Child</p> <p>Delivery: Researcher</p> <p>Duration: Participants received the accelerometer on a Tuesday afternoon during school hours, with actual registration starting Tuesday at midnight. After 5 full days of registration, on the subsequent Monday, the accelerometers were reassembled, data were downloaded to a personal</p>	<p>The study states, 'JUMP-in is a school-based strategy combining environmental policy, neighborhood, parents- and personal components.'</p> <p>Not sure if this is what we mean by policy.</p>



Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			<p>healthy eating environment, (vi) maintaining motivation, (vii) reading labels, and (viii) portion sizes. The intervention was delivered by school personnel (facilitators) in the elementary schools to primary caregivers of 3<sup>rd</sup> grade students.</p> <p>Target: Parent/Caregiver</p> <p>Delivery: School personnel</p> <p>Duration: Duration (e.g., length of educational or counseling sessions): 90 mins</p> <p>Other: 8 lessons</p> <p>Comment: Children in the “enrolled population” were placed in three groups based on number of lessons attended by their caregivers (0, 1–4,</p>		<p>motivation, (vii) reading labels, and (viii) portion sizes. The intervention was delivered by school personnel (facilitators) in the elementary schools to primary caregivers of 3<sup>rd</sup> grade students.</p> <p>Target: Parent/Caregiver.</p> <p>Delivery: School personnel</p> <p>Duration: (Length of educational or counseling sessions): 90 mins</p> <p>Other: 8 lessons</p> <p>Comment: Children in the “enrolled population” were placed in three groups based on number of lessons attended by their caregivers (0, 1–4, 5–8) and compared (Table 2). Children of caregivers who completed 5–8 lessons were referred to as “completers” and were categorized into Fall</p>			computer, and accelerometers were reinitialized for renewed distribution on Tuesday.	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			5–8) and compared (Table 2). Children of caregivers who completed 5–8 lessons were referred to as “completers” and were categorized into Fall and Spring groups based on when the caregiver participated in the intervention sessions. Crossover analysis was performed on the “completers” who had complete BMI data at all three data collection points (n = 122, Figure 1) focusing on intervention effects for the “completers” and the primary outcome measure of change from baseline in BMI z-score (26).		and Spring groups based on when the caregiver participated in the intervention sessions. Crossover analysis was performed on the “completers” who had complete BMI data at all three data collection points (n = 122, Figure 1) focusing on intervention effects for the “completers” and the primary outcome measure of change from baseline in BMI z-score (26).				
Bush, 1989 <sup>b</sup>	2	Full/part-intervention group  Length of intervention, weeks: 104	Children received curriculum on nutrition, exercise and smoking from teachers, and received a personalized health		Children received curriculum on nutrition, exercise and smoking from teachers, and received a personalized health screening in the fall of		Goal setting		

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		Setting: School school heart disease prevention curriculum.	screening in the fall of each school year, with each student given results to place on a “Health Passport (full-intervention. The second or part-intervention group of students received the curriculum and the health screening, but only their parents received the results of their cholesterol tests the students were not provided with the results to enter on their Health Passports with other screening results. Teachers received training from researchers on how to deliver the program (curriculum). Parents were mailed copies of a quarterly “Know Your Body” health newsletter and two copies of their child’s screening results—one copy		each school year, with each student given results to place on a “Health Passport (full-intervention. The second or part-intervention group of students received the curriculum and the health screening, but only their parents received the results of their cholesterol tests. The students were not provided with the results to enter on their Health Passports with other screening results. Teachers received training from researchers on how to deliver the program (curriculum). Parents were mailed copies of a quarterly “Know Your Body” health newsletter and two copies of their child’s screening results—one copy to keep and one for the child’s physician—with an explanation of each value.  Target: Child Parent/Caregiver				

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			<p>to keep and one for the child's physician—with an explanation of each value.</p> <p>Target: Child Parent/Caregiver, Educator</p> <p>Delivery: Researcher Teacher</p> <p>Duration: 45 mins/session for children. 3 hrs/session for teachers.</p> <p>Frequency: 2 sessions/week for children 4 sessions/school year for teachers</p> <p>Other: quarterly newsletter for parents</p>		<p>Educator.</p> <p>Delivery: Researcher Teacher.</p> <p>Duration: 45 mins/session for children. 3 hrs/session for teachers for curriculum 0.08 per week newsletter</p> <p>Frequency (e.g., number of sessions per week): 2 sessions/week for children. 4 sessions/school year for teachers.</p> <p>Other: quarterly newsletter for parents.</p>				
Chiodera, 2008 <sup>7</sup>	1	No control/all arms were active							
Chiodera, 2008 <sup>7</sup>	2	Professionally guided physical exercise.				This program aimed to professionally qualify the teaching of physical education in primary schools			

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		<p>Length of intervention, weeks: 34</p> <p>Setting: School</p>				<p>without changing the total amount of hours dedicated per week. Each teacher followed a specific program of physical education. The lessons focused on the development of the following motor abilities (both conditional and coordinative): (i) speed (ii) trunk flexibility (iii) long jumping (iv) somersault (first and second grades) and (v) Harre circuit test (third, fourth and fifth grades).</p> <p>Target: Child</p> <p>Delivery: Professional trainer (instead of the regular teacher)</p> <p>Duration: 99 lessons in the study period</p> <p>Frequency: 3 lessons/week</p>			

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Damon, 2005 <sup>9</sup>	2	Length of intervention, weeks: 10 months  Setting: School: Nutrition and PE	Nutrition knowledge  Target: Child  Delivery: Researcher Clinician Teacher  Duration: 1 hour Frequency: 1 session per week			PE activity  Target: Child  Delivery: Teacher			
Donnelly, 2009 <sup>11</sup>	2	PAAC  Length of intervention, weeks: fall 2003-spring 2006  Setting: School moderate to vigorous physically active academic lessons.			Classroom teacher training for implementation of PAAC.  Target: Educator  Duration: included in a 6-hr in-service/school year	90 min/wk of moderate to vigorous physically active academic lessons  Target: Child Delivery: Teacher  Duration: 90 mins/week.  Comment: Ninety minutes was chosen as the target since children were receiving 60 min of physical education per week and combined with PAAC lessons and this would total 150 min of PA per week which was consistent with recommendations			The purpose of this WSB intervention was to evaluate its effectiveness for increasing the frequency of walking to and from school among elementary school children. The WSB was only cancelled when temperatures were below 25°F or if it was raining or snowing at the scheduled walk time

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						from Healthy People 2010			
Foster, 2010 <sup>12</sup>	2	The intervention consisted of four integrated components: nutrition; physical activity; behavioral knowledge and skills; and communication s and social marketing. The rationale, techniques, and pilot testing of each component are briefly summarized below. All intervention components lasted for 5 semesters (second semester of 6th grade, both semesters of 7th grade, and both semesters of 8th grade).		The nutrition component targeted the quantity and nutritional quality of foods and beverages served throughout the school environment (cafeteria, vending, a la carte options, snack bars, school stores, fundraisers, and classroom celebrations).		The physical education (PE) component was designed to increase the amount of time students spent in moderate-to-vigorous physical activity (MVPA), defined as a heart rate $\geq 130$ beats per minute. Intervention schools were required to schedule $\geq 225$ minutes of PE over a 10-day period throughout the entire school year in order to achieve the target of $\geq 150$ minutes of MVPA per 10 days.		Behavioral knowledge and skills were delivered through a classroom-based program, FLASH (Fun Learning Activities for Student Health) which targeted awareness, knowledge, behavioral skills (e.g., self-monitoring, goal setting), and peer influence for behavior change. Each semester students received a series of 8-10 FLASH interactive sessions, 30 minutes each, with multiple activities per session delivered by teachers.	
Gortmaker,	2	Planet health	Classroom		Classroom		Target: Teacher		Children in the “enrolled

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1999 <sup>15</sup>		intervention  Length of intervention, weeks: 68 weeks  Setting: School Classroom and physical education inter-disciplinary curriculum	interdisciplinary curriculum focused on behavioral changes to decreasing consumption of high-fat foods and increasing consumption of fruits and vegetables to 5 a day or more.  Target: Child  Delivery: Teacher  Duration: one to two 45 minutes  Frequency: 32 sessions in 2 school years.		interdisciplinary curriculum focused on behavioral changes to increasing moderate and vigorous physical activity. Physical education materials focused on activity and inactivity themes and included student self-assessments of activity and inactivity levels and goal setting and evaluations for reducing inactivity, replacing inactive time with moderate and vigorous physical activities of their choosing.  Target: Child  Delivery: Teacher  Duration: thirty 5-minute micro units Other: the first 5 micro units focused on Fit-Check self-assessments and goal setting.		Delivery: An additional lesson developed a 2-week campaign to reduce television viewing in households ("Power Down") Other :incentives		population" were placed in three groups based on number of lessons attended by their caregivers (0, 1–4, 5–8) and compared (Table 2). Children of caregivers who completed 5–8 lessons were referred to as "completers" and were categorized into Fall and Spring groups based on when the caregiver participated in the intervention sessions. Crossover analysis was performed on the "completers" who had complete BMI data at all three data collection points (n = 122, Figure 1) focusing on intervention effects for the "completers" and the primary outcome measure of change from baseline in BMI z-score (26).
Graf, 2008 <sup>16</sup>	2	Health education and PA  Length of	Promotion of health through extra health education lessons. These lessons mainly		Promotion of health through extra health education lessons. These lessons mainly dealt with biological	Promotion of physical activity through: Providing physical activity breaks once a morning. Providing	Other :health education lessons also dealt with self-management.	Goal setting Pedometer Other :Videos, internet or CD-ROM  Target: Child	Behavior Change Methods Used: Self-monitoring, Self-evaluation, Reward increasing skills, Goal



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		intervention, weeks: ~208  Setting: School	dealt with biological background, nutrition, and self-management  Target: Child  Delivery: Teacher  Duration: 20-30 min/lesson  Frequency: One lesson/week.		background, nutrition, and self-management . Target: Child  Delivery: Teacher  Duration: 20-30 min/lesson Frequency: One lesson/week	physical activity opportunities during breaks and optimized PE classes.  Target: Child  Delivery: Teacher  Duration: Physical activity breaks were 5 minutes each morning  Frequency: ~5 breaks/week (assume)  Comment: physical activity breaks (5 min each) should be allowed during lessons once a morning. Furthermore, pupils were given PA opportunities during breaks and their physical education lessons		Delivery: Teacher  Duration: Supportive Material for the Educational Program include Individually computer-tailored advice via Internet or CD-ROM (TEST it) Pocket-sized diary (CHECK it) Pedometer and Supportive video material.	setting, Environmental changes, Social encouragement, Social support, Information regarding behavior, Personalized messages.
Gutin, <sup>17</sup> 2008 Yin, <sup>63</sup> 2005	1	Other: regular health screening diet/PA information							
Gutin, <sup>17</sup> 2008 Yin,	2	"fitogenic group" [Yin		As part of the PA sessions, youths		After-school PA sessions. Sessions			Note: the intervention educated parents, and

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2005 <sup>63</sup>		2005a] Length of intervention, weeks: ~138 Setting: School An after-school program (PA healthy snacks plus academic enrichment/homework assistance) [Yin 2005a]		were provided with a healthy snack in the initial 40-minute period of each session. The authors consider this to be a modest dietary intervention as these snacks might have been different from the after-school snacks the children would have ordinarily eaten in after-school hours. Important to note that no attempt was made to limit energy intake. This modest nutritional intervention was the USDA after-school snacks program. [Yin 2005a] According to the USDA program guidelines, qualifying snacks must include at least two different items from the following four		included an initial 40-min period during which the youths were provided with healthy snack, academic enrichment and homework assistance. The remaining 80 minutes were devoted to PA. These 80 minutes included a variety of activities designed to improve sport skills, aerobic fitness, strength, and flexibility. Around 20 minutes of warm-up and skills instruction. [Yin 2005b]. About 40 mins of continuous moderate-vigorous PA (MVPA) which involved modified tag games and ball games [Yin 2005b]. The aim of MVPA was to achieve a heart rate of 140bpm. [Yin 2005 c] About 10 minutes of calisthenics and cool-down [Yin 2005b] The activities were designed to be mastery-oriented rather than			changed children's behaviors via teachers' daily activities and fruits provided. Overall, the intervention focused on improving health behavior on a daily basis in the day care setting, aimed at establishing a health promoting behavior program that might also be maintained outside of the daycare setting, e.g. at home

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				<p>groups: (a) a serving of fluid milk, (b) a serving of meat or meat alternative (cheese or peanut butter), (c) a serving of vegetables or fruits or full-strength vegetable or fruit juice, and (d) a serving of whole grain bread, enriched bread, or cereal. [Yin 2005a]</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Other: Richmond County Board of Education (RCBE) school nutrition service staff.</p> <p>Other: Provide healthy snacks using the USDA after-school snacks program in each after-school session.</p> <p>Comment: 5</p>		<p>competitive. Furthermore, each month had a different theme to keep students interested in the activities. [Yin 2005b]</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Other: Certified schoolteachers and paraprofessionals, most employed at participating school [Yin 2005a].</p> <p>Duration: 80 mins/session</p> <p>Frequency: 5 sessions/week on school days, for 3 school years.</p> <p>Other: Participants were offered flexibility in that they did not have to attend every day to continue in the program.</p>			

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				days/week*3 school years					
Haerens, 2006 <sup>18</sup>	2	<p>Intervention only</p> <p>Length of intervention, weeks: 91</p> <p>Setting: School :school-based environmental modifications, activities to promote healthy eating and physical activity</p>	<p>Children received additional information through folders and posters about the improved health consequences of eating fruit as opposed to snacks and drinking water rather than soft drinks. Over the 2 school years, a total of 2 class hours was spent on the promotion of healthy eating at the personal level. Every school year, children got the computer-tailored intervention for fat intake and fruit intake during 1 class hour. Questionnaires concerning demographics, fat intake, fruit intake, and psychosocial determinants of food choices lead to tailored fat and fruit advice. After completing the</p>	<p>The food intervention focused on three behavioral changes that were supported by environmental changes: increasing fruit consumption to at least two pieces a day, reducing soft drink consumption and increasing water consumption to 1.5 L/d, and reducing fat intake. To facilitate fruit consumption, schools were asked to sell fruit at school at very low prices or for free at least once a week. It was also suggested to offer fruit as a dessert during lunch break. Schools tried to promote drinking water by offering it for free or at a</p>	<p>The computer-tailored intervention for physical activity was completed once each school year, during 1 class hour. First, Children had to fill out questions on the computer screen. After completing all questions, tailored feedback was displayed immediately on the screen. First, a general introduction and normative feedback were presented. The normative feedback related the children's activity levels to the current physical activity recommendations. Based on the theory of planned behavior, children got tailored feedback about their intentions, attitudes, self-efficacy, social support, knowledge, benefits, and barriers related to physical activity. The Trans theoretical</p>	<p>Schools were encouraged to create more opportunities to be physically active during breaks, at noon, or after school hours. This resulted in a weekly organization of an average 4.7 hours of extra physical activities. Schools were encouraged to vary the content of the physical activities offered to reach all pupils. The organization of non-competitive activities was encouraged to increase the engagement of less skilled children. Additionally, extra sports materials were made available. Every school received an intervention box with sports materials such as ropes, Frisbees, balls, beach ball sets, etc. Sports materials were made available during</p>		<p>Other: Steps taken to increase awareness of the intervention. A STOPP newsletter distributed to parents and school staff. Also, research staff had meetings with the school personnel. School nurses received education in obesity-related problems. Target: Parent/Caregiver Educator Other: School nurses Delivery: Researcher Duration: STOPP newsletter distributed twice annually. The meetings were once every term.</p>	

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			questionnaire, tailored feedback was displayed immediately on the screen. Both the fat and the fruit advice started with a general introduction, followed by normative feedback, which related their intakes to the recommended intakes. The fat advice indicated the sources of fat in the diet and tips were given on how to replace fatty foods. Teachers were encouraged to organize extra supportive activities like healthy breakfasts, an educational game concerning the food pyramid, and a poster design competition as suggested in the intervention manual.  Target: Child	lower price than soft drinks. All children received a free water can to make it possible to bring water to school.  Target: Child  Delivery: Researcher  Other: School. Focus on fruits and water	Model was used to match content and approach of this feedback to the stages of changes. Pre-contemplators and contemplators received general information. Children in the preparation stage received more specific information on physical activity and health and were motivated to become more active. In the action stage, children were motivated to stay active, and in the maintenance stage, children were told that they were doing fine and should carry on with their healthy behavior. Overall, an active lifestyle and participation in sports activities were promoted in an advice sheet of approximately five to six pages. Target: Child Delivery: Researcher Other: Over 2 school years a total of 4 class hours was spent on the promotion of	breaks (1 of 10 schools), at noon (6 of 10 schools), and during after school hours (3 of 10 schools). During classes, all children had to cycle for 10 minutes on a computerized cycle ergometer.  Target: Child  Delivery: Teacher  Duration: 60 minutes  Frequency: one session per day			

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			<p>Educator</p> <p>Delivery: Researcher, Teacher</p> <p>Duration: NR</p> <p>Other: child targeted sessions: 2 class hours over 2 years.</p>		physical activity at the personal level.				
Haerens, 2006 <sup>18</sup>	3	<p>Intervention: Parent involvement. Length of intervention, weeks: 91</p> <p>Setting: School :school-based environmental modifications activities to promote healthy food and physical activity Home :focus was on involving and informing parents via newsletters, parent-targeted computerized intervention.</p>	<p>Children received additional information through folders and posters about the improved health consequences of eating fruit as opposed to snacks and drinking water rather than soft drinks. Over the 2 school years, a total of 2 class hours was spent on the promotion of healthy eating at the personal level. Every school year, children got the computer-tailored intervention for fat intake and fruit intake during 1</p>	<p>The food intervention focused on three behavioral changes that were supported by environmental changes: increasing fruit consumption to at least two pieces a day, reducing soft drink consumption and increasing water consumption to 1.5 L/d, and reducing fat intake. To facilitate fruit consumption, schools were asked to sell fruit at school at very</p>	<p>The computer-tailored intervention for physical activity was completed once each school year, during 1 class hour. First, Children had to fill out questions on the computer screen. After completing all questions, tailored feedback was displayed immediately on the screen. First, a general introduction and normative feedback were presented. The normative feedback related the children's activity levels to the current physical activity recommendations.</p>	<p>Schools were encouraged to create more opportunities to be physically active during breaks, at noon, or after school hours. This resulted in a weekly organization of an average 4.7 hours of extra physical activities. Schools were encouraged to vary the content of the physical activities offered to reach all pupils. The organization of non-competitive activities was encouraged to increase the engagement of less skilled children. Additionally, extra</p>			

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			class hour. Questionnaires concerning demographics, fat intake, fruit intake, and psychosocial determinants of food choices lead to tailored fat and fruit advice. After completing the questionnaire, tailored feedback was displayed immediately on the screen. Both the fat and the fruit advice started with a general introduction, followed by normative feedback, which related their intakes to the recommended intakes. The fat advice indicated the sources of fat in the diet and tips were given on how to replace fatty foods. In the same way as in the physical activity advice, feedback was based on the	low prices or for free at least once a week. On average, 69% (11% to 100%) of the pupils subscribed to the school fruit program. It was also suggested to offer fruit as a dessert during lunch break. Schools tried to promote drinking water by offering it for free or at a lower price than soft drinks. All children received a free water can to make it possible to bring water to school. Target: Child Delivery: Researcher Other: School Duration: Change in intake (e.g., increased fruit and vegetable intake decrease fat intake): focus on fruits and water	Based on the theory of planned behavior, children got tailored feedback about their intentions, attitudes, self-efficacy, social support, knowledge, benefits, and barriers related to physical activity. The Trans theoretical Model was used to match content and approach of this feedback to the stages of changes. Pre-contemplators and contemplators received general information. Children in the preparation stage received more specific information on physical activity and health and were motivated to become more active. In the action stage, children were motivated to stay active, and in the maintenance stage, children were told that they were doing fine and should carry on with their healthy behavior. Overall, an active lifestyle and	sports materials were made available. Every school received an intervention box with sports materials such as ropes, Frisbees, balls, beach ball sets, etc. Sports materials were made available during breaks (1 of 10 schools), at noon (6 of 10 schools), and during after school hours (3 of 10 schools). Over the 2 school years, a total of 4 class hours was spent on the promotion of physical activity at the personal level. Children received a physical fitness test and a computer tailored intervention for physical activity. During classes, all children had to cycle for 10 minutes on a computerized cycle ergometer.  Target: Child  Delivery: Teacher			

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			Theory of Planned Behavior and the Trans theoretical Model. Teachers were encouraged to organize extra supportive activities like healthy breakfasts, an educational game concerning the food pyramid, and a poster design competition as suggested in the intervention manual. Parents were involved and educated to promote healthy diet. Schools were asked to set up an interactive meeting on healthy food, physical activity, and the relationship with overweight and health. Three times a year, information on healthy food and physical activity was published in the school paper and newsletters for the parents. In addition, all parents		participation in sports activities were promoted in an advice sheet of approximately five to six pages. Parents were involved and educated to promote healthy diet. Schools were asked to set up an interactive meeting on healthy food, physical activity, and the relationship with overweight and health. Three times a year, information on healthy food and physical activity was published in the school paper and newsletters for the parents. In addition, all parents received a free CD-ROM with the adult computer tailored intervention for fat intake and physical activity to complete at home. Through an information folder, parents were informed that their child accomplished the same computer-tailored program at school.	Duration: 60  Frequency: one session per day			



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			<p>received a free CD-ROM with the adult computer tailored intervention for fat intake and physical activity to complete at home. Through an information folder, parents were informed that their child accomplished the same computer-tailored program at school.</p> <p>Target: Child Parent/Caregiver, Educator</p> <p>Delivery:</p> <p>Researcher, Teacher</p> <p>Duration: 2 class hours over 2 years</p>		<p>Target: Child, Parent/Caregiver</p> <p>Delivery: Researcher</p> <p>Duration: 2 session in 2 years</p>				
Heelan, 2009 <sup>19</sup>	2	Walking School Bus (WSB) program Length of intervention, weeks: 78 Setting: School A walk-to-			Walking School Bus (WSB) program A WSB program relies on the concept that children walk to school in groups along a set route (and with set stops along the way), with adults essentially				

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		school program.			<p>serving as the bus driver for supervision. For the WSB intervention in this study, neighborhood walk-stops were designated within a 1-mile radius of the two schools that were assigned the WSB intervention. An adult WSB leader (a paid college student) met the neighborhood children at these designated walk-stops at specified times each morning and walked the group of children to their school and back to the walk stop in the afternoon. Eight routes were created for the 2 WSB schools. On average, participants walked 0.65 miles each way to and from school.</p> <p>Duration: Entire academic year for 2 "school years" - 9 months/year</p> <p>Frequency: Twice a day (Once in the morning and once in</p>				

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					the afternoon).				
James, 2004 <sup>21</sup>	2	Intervention Length of intervention, weeks: NR Setting: School classroom-based delivery of intervention.	One investigator delivered the program to all intervention classes. The program's main objective was to discourage consumption of fizzy drinks (sweetened and unsweetened) alongside positive affirmation of a balanced healthy diet. The program was designed to have one simple, uncomplicated message to maximize response in children. Children were told that by decreasing sugar consumption they would improve overall wellbeing and by reducing the consumption of diet carbonated drinks they would benefit dental health.  Target: Child  Delivery:				Food diary		

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			Researcher  Other: with teacher assistance encouraged  Duration:1 hour/session  Frequency: 4 sessions total Comment: each session had a different activity and focus related to the same message. The initial session was focused on the balance of good health and promotion of drinking water. Children tasted fruit and learned about the sweetness of natural products. Each child was also given a tooth immersed in a sweetened carbonated cola to assess its effect on dentition. The second and third sessions focused on a music competition where						

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			each class was given a copy of a song (Ditch the Fizz) and challenged to produce a song or rap with a healthy message. The final session involved art presentations and a classroom quiz based on a popular TV game show. Children were also encouraged to access more info through the project's website ( <a href="http://www.b-dec.com">www.b-dec.com</a> ).						
James, 2007 <sup>22</sup>	2	Intervention group Length of intervention, weeks: 39 Setting: School Education promoting a healthy diet and discouraging the consumption of carbonated drinks.	To discourage the consumption of "fizzy" drinks (sweetened and unsweetened) with positive affirmation of a balanced healthy diet.  Target: Child  Delivery: Researcher  Duration: 4 one hour sessions total  Comment: Children						

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			were told that by decreasing sugar consumption they would improve overall wellbeing and that by reducing the consumption of diet carbonated drinks they would benefit dental health. The initial session focused on the balance of good health and promotion of drinking water. The children tasted fruit to learn about the sweetness of natural products. In addition, each class was given a tooth immersed in a sweetened carbonated cola to assess its effect on dentition. The second and third sessions comprised a music competition each class was given a copy of a song (Ditch the Fizz) and challenged to						

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			produce a song or a rap with a healthy message. The final session involved presentations of art and a classroom quiz based on a popular television game show. The children were also encouraged to access further information through the project's website (www.b-dec.com).						
Kafatos, 2005 <sup>23</sup>	2	Cretan health and Nutrition Education Program  Length of intervention, weeks: 312  Setting: School focus on classrooms, PE, and playground.	Health and nutrition component Target: Child Delivery: Teacher Duration: 13-17 hours of classroom material annually Comment: Classroom modules were designed to develop behavioral capability, expectations and self-efficacy for healthful eating. Learning activities were designed to influence expectancies that placed an important		Theoretical component delivered by physical education instructors  Target: Child  Delivery: Teacher  Duration: 4-6 h for classroom material per year  Comment: Theory comprised of two parts: 1) that which follows screening and explains the tests and results, and 2) that which concentrates on intervention to improve fitness results through	Practical component delivered by physical education instructors Target: Child Delivery: Teacher Duration: 45 min/session Frequency: two sessions per week Comment: Practical aspects were delivered in the playground. Fitness-oriented exercise sessions were enjoyable, of moderate intensity and involved total classroom participation. All sessions, at the		Food diary Target: Child Duration: Participants were to complete daily diaries at Weeks 1, 4, 8, 12, and 24 Comment: Diaries recorded the following: the total time of the 10 activities they spent the most time doing that day, not including school or sleeping pedometer totals food intake specifying servings per day by food group and number of fast-food meals and number of best choice lunches. Participants were reminded during the KLF exercise programs to	KLF group met once weekly for 12 consecutive weeks. The KLF program sessions were held immediately after school at the elementary school.

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			value on achieving this behavior. Methods included modeling (through stories, role playing and demonstrations), self-monitoring of behavior, contracting to try new behaviors, skill development and verbal praise. Cues, posters and displays were also provided in the classroom.		behavioral changes. Regarding the first part, explanations were offered in a simple, friendly way about the importance of the fitness and anthropometric tests in relation to being strong. Regarding the second part, self-improvement was emphasized to allow for success on a regular basis, and progression of skills and fitness scores identified for each grade to help ensure continual fitness development from year to year.	beginning, consisted of a short warm up period and stretching exercises. In the remainder of the time pupils were engaged in activities such as skipping, fitness stations and several aerobic group games. Less emphasis was placed on competition and winning and rewards were given for all levels of effort and ability.		complete the diaries themselves in the upcoming week. The intent of study diaries was to build awareness about healthy food choices and activity patterns.	
Kain, 2009 <sup>24</sup>	2	A school-based intervention that included a diet/nutrition component and enhanced physical activity. Length of intervention, weeks: 102 Setting: School focused on class and PE,	Teachers (4th–7th grades): Training by nutritionist, 10 h in total. Children: Contents on healthy eating from trained teachers (4th–6th grades: 8–11 h 7th grade: 5–6 h). Parental involvement: Two educational lessons by the nutritionist to parents of 4th–7th grade		Teachers (4th–7th grades): Trained in the CALC program. Children: 90 min of additional weekly PE classes. Four sessions to 1st–4th grade teachers (n=28) on correct application of PE curriculum Active recess during 4 months. Supervised by PE teacher  Target: Child			Other :a novel interactive card game Target: Child Delivery: Researcher Duration: A novel interactive card game, “GoTri,” was developed. GoTri simulated completing a triathlon, and students were provided with a starter set of cards. They then had to complete specific physical activities, often with friends or a family	



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		school kiosks, and recess	<p>children.Supervised by nutritionist</p> <p>Target: Child Parent/Caregiver Educator</p> <p>Other: Teacher</p> <p>Delivery: Teacher</p> <p>Other: Nutritionist Comment: Duration and frequency varied according to different intervention components. In 2004, some components of the intervention were discontinued or modified.</p>		<p>Educator Other, Teacher</p> <p>Delivery: Teacher</p> <p>Other: PE teacher Comment: Duration and frequency varied according to different intervention components. In 2004, some components of the intervention were discontinued or modified.</p>			member, or to follow particular dietary guidelines to earn 10 "missing" cards. Once students had obtained a complete set,they were able to play the game against each other.	
Lazaar, 2007 <sup>26</sup>	2	Group GC(ob) Length of intervention, weeks: NR							
Lazaar, 2007 <sup>26</sup>	3	Group GI (No) Length of intervention, weeks: 26 Setting: School PA after school				After-school exercise program (a playful physical practice+ dynamic exercise ) Target: Child Delivery: Teacher Duration: 1 hour/session Frequency: twice/week			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
						Comment: Children from Gln and Glob were required to follow PA after class, twice a week for 1 h. The exercise program was designed to enhance the joy of movement, body awareness and team spirit in order to bring about long-term changes in behavioral patterns. Moreover, all the sessions aimed at meeting the same double objective: a playful physical practice and 45 min of dynamic exercise within 1 hour of PA.			
Lazaar, 2007 <sup>26</sup>	4	Group GI (ob)  Length of intervention, weeks: 26  Setting: School PA after school				After-school exercise program (a playful physical practice+ dynamic exercise )  Target: Child  Delivery: Teacher  Duration: 1 hour/session  Frequency: twice/week Comment: Children		Other :Parental involvement  Target: Parent/Caregiver  Delivery: Teacher  Duration: Parents in the Weight control intervention schools received weekly newsletters with information that mirrored the children's curriculum. Each newsletter had a	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
						from GINo and GIOb were required to follow PA after class, twice a week for 1 h. The exercise program was designed to enhance the joy of movement, body awareness and team spirit in order to bring about long-term changes in behavioral patterns. Moreover, all the sessions aimed at meeting the same double objective: a playful physical practice and 45 min of dynamic exercise within 1 h of PA.		section on healthy eating and sections on healthy exercise. Parents also were asked to write down specific ways they might increase their family's fruit and vegetable intake. Parents received a \$5.00 grocery store coupon for each homework assignment they completed and turned in.	
Madsen, 1993 <sup>30</sup>	1	No control/all arms were active							Abstracted from refid <sup>32</sup> <sup>60</sup> Parents were also involved in the study. Meetings were organized whereby parents in the intervention group were given a file containing their child's screening results. Presentation on the importance of topics relevant to dietary and exercise habits of the children were issued. Parents were encouraged to modify their dietary habits as

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
									well as those of their children and support them in increasing their physical activity.
Madsen, 1993 <sup>30</sup>	2	<p>Health behavior change Length of intervention, weeks: 52 weeks</p> <p>Setting: School Training families on self-monitoring and dietary and physical activity behavior change.</p>	<p>Training in self-monitoring. Reduce sodium to 3 g per day and fat intake to 30% of total daily kilocalories. A heart healthy potluck dinner to celebrate 'graduation' from the intensive intervention. Maintenance sessions covered breaking habit chains, making healthy choices in restaurants, grocery shopping, friend and family peer pressure and planned and unplanned breaks in dietary routines.</p> <p>Target: Child, Family</p> <p>Delivery: Facilitators</p> <p>Duration: weekly for 12 weeks of</p>		<p>Self monitoring focused on physical activity. Starts with aerobic exercise session with warm-up and cool-down, there was a gradual increase in intensity and enjoyable, family-oriented activities were emphasized. Then, separate adult and child education segments provided new information and skills at each session. Active participation was stressed and learning games were developed for children</p> <p>Target: Child, Family</p> <p>Delivery: Facilitators</p> <p>Duration: weekly for 12 weeks of intensive intervention followed by 6 maintenance sessions over 9 months.</p>		Goal setting		

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			intensive intervention followed by 6 maintenance sessions over 9 months.						
Madsen, 2009 <sup>64</sup>	1	No control/all arms were active							There was a parent intervention intended to help parents encourage behavior change attempts through praise, active support, and positive role-modeling. (No further information is provided.)
Madsen, 2009 <sup>64</sup>	2	SCORES Length of intervention, weeks: 18 (8 weeks in the fall, 10 in the spring)  Setting: School After-school physical activity and literacy program.				Children in the program play soccer three days a week (two practice days with up to two hours of moderate-to-vigorous physical activity and one inter-school game day with a warm-up period followed by a one-hour game)  Target: Child  Delivery: Teacher Duration: 3	Other Literacy improvement: participants perform community service or undertake creative writing the remaining two days a week.		
Madsen, 2011 <sup>65</sup>	2	Parent notification of BMI screening					Other: Parent notification of BMI screening (policy)		

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		Setting: School school-based BMI screening with optional parent notification  Policy: Yes							
Manios, 1999 <sup>32</sup>	1	Other: Usual care for children (play freely without a structured program, supervised by class teachers), and parents received mailed envelopes with all medical screening results with brief comments.						Other: Home Team component (described in detail elsewhere)  Target: Child Parent/Caregiver, family	The program and its adoption in the El Paso community have been described in detail elsewhere. (References are listed in Study Characteristics form). "Although the training sessions presented national cat materials and procedures, there was a distinct emphasis on adaptation rather than fidelity (using materials exactly as they were designed). How the program was adapted to a low-income US Mexico border region has been detailed elsewhere(37) and included ethnic variations on curricula, particular school- and district-based criteria variations, and variations due to regional and statewide educational and health mandates. One of the most

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									noticeable differences from the national CATCH implementation was that schools were allowed to implement each component of El Paso CATCH in a way that suited the school environment. For instance, some schools did not use the classroom curriculum for anything but a general reference and had classroom teachers participate in school-wide CATCH events each year instead." "Control schools did not receive any of the El Paso CATCH program materials and did not attend any of the training for the program. However, they received \$1000 at the beginning of each school year as an incentive for participation."
Manios, 1999 <sup>32</sup>	2	Health education Length of intervention, weeks: 156 Setting: School health education plus	School-based intervention with health and nutritional components were delivered in the classroom for a total of 13 to 17 hrs		Physical fitness and activity component included 4-6 hrs of educational sessions each year delivered by PE teachers to target students. Students were to complete	Practical PE sessions were delivered in two PE sessions per week delivered by PE instructors targeting children. Activities included stretching exercises, skipping,			

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		PA components.	<p>over the academic period targeting students. Parents also attended educational sessions on dietary habits in children and received their child's medical screening.</p> <p>Target: Child, parent/ Caregiver</p> <p>Delivery: Teacher</p> <p>Duration: meeting held annually for parents. Other: 13-17h annually for children</p> <p>Comment: Provide children with workbooks and design teacher aids. Provide parents screening results and presentations on the importance of topics relevant to children's dietary and exercise habits.</p>		<p>workbook exercises at home with parents.</p> <p>Target: Child, parent/ Caregiver</p> <p>Delivery: PE instructors</p> <p>Duration: meeting held annually for parent.</p> <p>Other: 4-6 h of classroom material per year for children. Comment: Theory comprised of two parts: 1) that which follows screening and explains the tests and results, and 2) that which concentrates on intervention to improve fitness results through behavioral changes. Regarding the first part, explanations were offered in a simple, friendly way about the importance of the fitness and anthropometric tests in relation to being strong. Regarding the second part, self-improvement was emphasized to allow</p>	<p>fitness stations and aerobic games.</p> <p>Target: Child Delivery, PE instructors</p> <p>Duration: 45 min/session</p> <p>Frequency: 2 sessions/week Other: about 60 sessions per year Comment: Practical aspects were delivered in the playground. Fitness-oriented exercise sessions were enjoyable, of moderate intensity and involved total classroom participation. All sessions, at the beginning, consisted of a short warm up period and stretching exercises. In the remainder of the time pupils were engaged in activities such as skipping, fitness stations and several aerobic group games.</p>			



Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
					for success on a regular basis, and progression of skills and fitness scores identified for each grade to help ensure continual fitness development from year to year. Three to five workbook exercises per year were completed at home by pupils together with their parents. For parents, they were provided with screening results and presentations on the importance of topics relevant to children's dietary and exercise habits	Less emphasis was placed on competition and winning and rewards were given for all levels of effort and ability.			
Manios, 2002 <sup>33</sup>	2	<p>Creten health and nutrition education program</p> <p>Length of intervention, weeks: 312</p> <p>Setting: School focus on classrooms, PE, and playground.</p>	Multi-component workbooks covering dietary issues were produced for grades 1-6 each year in addition to teaching aids given by teachers. The nutrition component was delivered in class by the teacher for 13-17 hours each year.		The theoretical part of the physical fitness and activity component was delivered by PE teachers in two-45-min sessions per week. Target: Child Delivery:Teacher Duration: 45 min/session Frequency :2 session/week Other: 4-6 h of classroom material per year	<p>Practical part of the physical fitness and activity component delivered by physical education instructors in 4-6 hrs of classroom material per year. Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 45 min/session</p>			

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			<p>Target: Child</p> <p>Delivery: Teacher</p> <p>Other: 13-17 hr of classroom material annually.</p> <p>Comment: Classroom modules were designed to develop behavioral capability, expectations and self-efficacy for healthful eating. Learning activities were designed to influence expectancies that placed an important value on achieving this behavior. Methods included modeling (through stories, role playing and demonstrations), self-monitoring of behavior, contracting to try new behaviors, skill development and verbal praise. Cues, posters and displays were also provided in the</p>		<p>Comment: Theory comprised of two parts: 1) that which follows screening and explains the tests and results, and 2) that which concentrates on intervention to improve fitness results through behavioral changes. Regarding the first part, explanations were offered in a simple, friendly way about the importance of the fitness and anthropometric tests in relation to being strong. Regarding the second part, self-improvement was emphasized to allow for success on a regular basis, and progression of skills and fitness scores identified for each grade to help ensure continual fitness development from year to year.</p>	<p>Frequency: 2 session/week</p> <p>Other: 4-6 h of classroom material per year</p> <p>Comment: Practical aspects were delivered in the playground. Fitness-oriented exercise sessions were enjoyable, of moderate intensity and involved total classroom participation. All sessions, at the beginning, consisted of a short warm up period and stretching exercises. In the remainder of the time pupils were engaged in activities such as skipping, fitness stations and several aerobic group games. Less emphasis was placed on competition and winning and rewards were given for all levels of effort and ability.</p>			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			classroom.						
Manios, 2006 <sup>34</sup>	2	Health and nutrition education Length of intervention, weeks: 156 Abstracted from <sup>32,60</sup>  Setting: School school health promotion program.	Health and Nutrition Education program based on the health profile component of the 'Know Your Body' school health-promotion program of the American Health. Foundation.  Target: Child Parent/Caregiver  Delivery: Teacher  Duration: Abstracted from Manios, 1999 <sup>32</sup> and Manios, 1998 <sup>60</sup> . Twice a year for parents, 13-17 hours of classroom material annually for children.		Abstracted from Manios, 1999 <sup>32</sup> and Manios, 1998 <sup>60</sup> .  Theoretical component of physical fitness and activity.  Target: Child, Parent/Caregiver  Delivery: PE instructors  Duration: twice a year for parents, 4-6 h of classroom material per year	Abstracted from Manios, 1999 <sup>32</sup> and Manios, 1998 <sup>60</sup> .  Practical component of physical fitness and activity.  Target: Child  Delivery: PE instructors  Duration: 45 min/session, two sessions per week.			
Muckelbauer, 2009 <sup>35</sup>	2	IG  Length of intervention, weeks: 47  Setting: School focused on classroom instruction on water needs of	To promote behavior change and health education  Target: Child  Delivery: Teacher  Duration: 45 min	To promote behavior change  Target: Child  Delivery: Researcher, Teacher  Comment: In each IG school, 1 water			Goal setting		

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		the body and the water circuit in nature installation of water fountain in schools.	Frequency: 4 sessions total  Comment: Classroom lessons dealing with the water needs of the body and the water circuit in nature were taught. At the beginning of the study, teachers received a booklet with the prepared curriculum and necessary materials to implement the lessons in the formal school curriculum. The lessons were developed by using the results of empirical teaching research and were intended to improve the constructs of intention, attitudes, and perceived behavioral control, on the basis of the theory of planned behavior.	fountain or 2 for schools with >150 participants, was installed. The fountains provided cooled, filtered, plain or optionally carbonated water. In addition, each child received a plastic water bottle (500 mL), and teachers were encouraged to organize filling of the water bottles each morning for all children in the corresponding classes.					
Neumark-Sztainer, 2010 <sup>36</sup>	2	New moves  Length of	Be fueled nutritional class to increase fruit and	Girls were served healthy foods during lunch get	Be fit physical activity to expose girls to be more physically active		Other :weight control behaviors	Other :home activities and reinforcements	Weight-control treatment was provided to the parents for eight weekly

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		intervention, weeks: 16 weeks  Setting: School All girls' physical education class.	vegetable intake, limit sugar-sweetened beverages, eat breakfast every day, pay attention to portion sizes and your body's signs of hunger and satiety.  Target: Child  Delivery: Teacher,  Other: New moves coaches Duration: 1day/week	together (lunch bunches) held at school during maintenance phase.  Target: Child  Delivery: New moves staff  Other: healthy food.	and take part in fun activities available in the community e.g. dance, hip hop, kickboxing.  Target: Child  Delivery: Teacher,  Other: New moves coaches  Duration: 4days/ week.			Target: Child  Delivery: parents  Duration: Child workbooks included five main sections: introduction to weight control and prevention, the Traffic-Light Diet, developing a healthy eating and activity environment for children, behavior change techniques, and maintenance of behavior change. Children were reinforced for completing their program-related activities at home by having a sticker placed on a tracking sheet.	meetings, followed by four biweekly and two monthly meetings during the 6-month intensive treatment. Participating parents and children attended the first meeting, at which they received the first modules in their parent and child workbooks.  Note: interventions mostly provided to parents, but parents can influence children through modeling and home activities.
Newton, 2010 <sup>37</sup>	1	No control/all arms were active							
Newton, 2010 <sup>37</sup>	2	Healthy Eating and Exercise (HEE) program  Length of intervention, weeks: 78 weeks  Setting: School A school-based environmental	To facilitate the dietary component's goals, school cafeteria menus were modified consistent with the stated dietary goals, they were hung in the classrooms, and healthy choices were announced via loudspeaker	The dietary component was intended to increase the (children's) consumption of fruits, vegetables, and grains and to decrease consumption of dietary fat.  Target: Child	Teachers were encouraged to model daily physical activity tips which engage students in short bouts of physical activity, and to discuss ways to promote physical activity outside of school. Target: Child Delivery: Teacher	The physical activity component was intended to increase physical activity to 60 minutes per day. Each classroom was provided with physical activity equipment that could be used indoors and outdoors. Teachers were encouraged to provide 5 minutes of	Other :Parental component aimed at encouraging families to make changes to the home environment that promote physical activity and healthy food options		

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		approach Policy: Yes	Materials were provided to the teachers through twelve, two-month long campaigns that could be used to increase children's knowledge of healthy eating and exercise habits. Teachers were provided with healthy nutrition tips  Target: Child, Educator  Duration: NR Duration (e.g., length of educational or counseling sessions): NR Materials provided to the teacher were through twelve, two month-long campaigns	Change in intake (e.g., increased fruit and vegetable intake, decreased fat intake): increase consumption of fruit, vegetables, and grains. Goals compatible with conventional nutrition recommendations: 5 fruits and vegetables per day [Williamson et al 2007] Change in calorie intake :NR Goals compatible with conventional nutrition recommendations: <30% of dietary energy from total fat, <10% energy from saturated fat, & 20-30 g fiber/d.[Williamson et al 2007]		physical activity after every 30 minutes of instruction  Target: Child  Delivery: Teacher  Duration: 60 minutes/day			
Reed, 2008 <sup>38</sup>	1	Other :usual practice group teachers were asked to continue their regular program of							

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		physical education and school-based PA.							
Reed, 2008 <sup>38</sup>	2	<p>INT (AS! BC model)</p> <p>Length of intervention, weeks: 47 weeks (11 months)</p> <p>Setting: School 11 out of 20 schools that volunteered to participate and were not already engaged in PA programs - 7 were randomized to INT, 3 to usual practice (control) 4 of these were "liaison" and 3 were "champion" which distinguished between level of facilitation provided to teachers</p>			<p>Possibly through the model's targeting of 6 "Action Zones" in the school: i) school environment, ii) scheduled physical education, iii) extra-curricular, iv) school spirit, v) family and community, and vi) classroom action towards the goal of delivering 15 min of moderate to intense PA daily for 75 extra minutes of PA weekly in the INT groups (for 150 minutes per week in total)- but this component was not explicitly elaborated on in this article nor the related ones mentioned earlier. A school Action Team made up of the school principal and/or teachers was convened at each school and this group worked with the AS! BC facilitator to design a program with</p>	<p>Again, possibly through the model's targeting of 6 "Action Zones" in the school: i) school environment, ii) scheduled physical education, iii) extra-curricular, iv) school spirit, v) family and community, and vi) classroom action towards the goal of delivering 15 min of moderate to intense PA daily for 75 extra minutes of PA weekly in the INT groups (for 150 minutes per week total) -teachers would provide opportunities in the classroom for students to "snack on physical activities", such as skipping, dancing, and resistance exercises throughout the school day</p> <p>Target: Child</p> <p>Delivery: Teacher</p>			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		(liaison group had weekly contact with the School Facilitator who would come to the classroom and provide mentorship and demonstration s of activities in the champion situation, the School Facilitator provided initial training and then provided support to a designated teacher "champion" (vs. every classroom) each room also had a Classroom Action Bin containing basic resources to support the teacher's Action Plan Home.			activities for each of the 6 zones. The facilitator also conducted a 1-day training of intervention group teachers.  Target: Child  Delivery: Teacher  Comment: BC INT schools were asked to deliver 15 min of moderate to intense physical activity daily to achieve 75 min of extra physical activity per week (in addition to 2X40 min PE classes.	Comment: BC INT schools were asked to deliver 15 min of moderate to intense physical activity daily to achieve 75 min of extra physical activity per week (in addition to 2X40 min PE classes.			



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		The intervention (INT group) targeted 6 action zones, 1 of which was "family and community Community or environment-level :same as above - the intervention targeted 6 action zones, 1 of which was "family and community.							
Sahota, 2001 <sup>41</sup>	2	Length of intervention, weeks: 52  Setting: School	Knowledge and attitudes towards healthy living  Target: Child  Delivery: Researcher, Teacher	Modifications of school meal  Target: Child  Delivery: Researcher		PE  Target: Child  Delivery: Researcher	Target: Researcher		
Sallis, 1993 <sup>42</sup>	2	Teacher-led  Length of intervention, weeks: 104  Setting: School PE class+ self-management curriculum+			Self-management curriculum to promote PA outside school for children.  Target: Child  Delivery: Teacher  Duration: 30	PE classes  Target: Child  Delivery: Teacher  Duration: 30 minutes/class  Frequency: 3 classes	Goal setting		

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		teachers' in-service training.			minutes/class  Frequency: 1 class/week  Comment: Each lesson taught a skill or concept believed to be relevant to generalizing physical activity outside of the school and maintaining activity habits after the end of the formal intervention.	/week.			
Sallis, 1993 <sup>42</sup>	3	Specialist-led Length of intervention: 2 school years Setting: School :PE class +self-management curriculum.			Self-management curriculum to promote PA outside school for children  Target: Child  Delivery: certified PE specialists  Duration: 30mins/class  Frequency: 1 class/week  Comment: Each lesson taught a skill or concept believed to be relevant to generalizing physical activity outside of the school and maintaining	PE classes  Target: Child  Delivery: certified PE specialists  Duration: 30 mins/class  Frequency: 3 classes/week.	Goal setting		The nutrition intervention curriculum also involved an initial session from Nov 1983 to Dec 1983 where teachers participated in half-day seminars on: (i) basic concepts on the physiology of nutrition, (ii) the role of diet in the prevention of chronic diseases, (iii) the 'prudent diet'--theoretical and practical aspects methodologies for nutrition behavior modification. School year is not explicitly defined in regards to number of months or weeks. However, it appears that

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					activity habits after the end of the formal intervention.				one school year is equivalent to 7 months.
Salmon, 2008 <sup>43</sup>	2	BM Length of intervention, weeks: 39 Setting: School (described): focused on PE classes, Home Intelligent TV viewing and reducing viewing time					Target: Teacher Duration: 40-50 min sessions. 18 sessions total Delivery: The aim of lessons 1, 2 and 4 was to increase children's awareness of time-use, including time spent watching TV, playing electronic games, using the computer and being physically active. Health benefits of physical activity were also covered. Lessons 3 and 5 involved the children self-monitoring the time they spent in sedentary behaviors (TV viewing, electronic games and computer use) and physical activity, respectively. Lessons 6 and 7 raised children's awareness of the home and		Teachers are trained by research staff in three half-day teacher workshops to implement the curriculum. Adherence to the teaching protocols is ascertained through a system of teacher monitoring, which includes documentation of attendance at training workshops and number of lessons taught, as well as periodic classroom visits by the research staff.

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
							community environments in relation to their sedentary and physical activity choices and opportunities, through map drawing and photographic techniques. Lesson 8 involved teaching the children decision-making skills, such as weighing up the positives and negatives of choosing between being active or sedentary in a variety of different scenarios. In lessons 9 and 10, the children developed their own physical activities and games in which they could participate as an alternative to being sedentary. Lesson 11 involved teaching children about 'intelligent viewing', where the		

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							child selects the TV programs that he/she wants to watch and limits viewing to those programs. This is to encourage children to engage in selective, rather than 'vegetative' viewing or channel surfing. Children were given their first 'Switch-off Challenge' that involved completing and signing a contract pledging to switch off one TV program per week over the next 4 weeks. Children were to return the contract signed by parents each week. In lesson 12, the focus was on increasing children's awareness of the purpose of advertisements on TV. Lessons 13 to 16 focused on advocacy, with children writing their own scripts,		

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							performing plays and designing posters about choices to be active or sedentary based on real life situations. The children participated in physical activities that they could easily perform at home on their own, or with friends or siblings.		
Salmon, 2008 <sup>43</sup>	3	<p>FMS</p> <p>Length of intervention, weeks: 39</p> <p>Setting: School indoor or outdoor physical activity facilities at each school.</p>			<p>To promote physical activity through mastery of fundamental movement skills</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 40-50 min/session. 19 sessions total</p> <p>Comment: The FMS intervention focused on six skills, including three object control skills (overhand throw, kick and strike) and three locomotors skills (run, dodge and</p>				

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
					vertical jump). The locomotors skills were selected based on evidence that children who are overweight or obese are less likely to demonstrate mastery of these skills compared with non-overweight children. The skills were taught with an emphasis on fun through games and maximum involvement for all the children. Most lessons focused on at least two skills, and each skill was a focus lesson in at least six or more sessions.				
Salmon, 2008 <sup>43</sup>	4	BM/FMS  Length of intervention, weeks: 39  Setting: School focused on PE classes indoor or outdoor physical activity facilities at each school Home intelligent TV viewing and				To promote physical activity through mastery of fundamental movement skills  Target: Child Delivery: Teacher  Duration: 40-50 min/session  Frequency: 19 sessions total  Comment: The FMS	Target: Teacher  Duration: 40-50 min sessions. 18 sessions total.  Delivery: The aim of lessons 1, 2 and 4 was to increase children's awareness of time-use, including time spent watching TV, playing electronic games, using the computer and being physically	Other :Additional components included: administration of the Eurofit test, provision of scorecards, and the offer of individual counseling if needed health promotion gathering for parents and local sports clubs.  Target: Child Delivery: Teacher  Other: Local sports clubs. Local sports clubs were involved in providing some	Description of Parent Involvement: Parents are important agents in shaping children's eating and physical activity behaviors. Besides the homework assignments and fitness score card, parents are involved by providing them with written information on the intervention and inviting them for a gathering at the beginning of the school year. During this gathering information is provided by the school

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		reducing viewing time.				intervention focused on six skills, including three object control skills (overhand throw, kick and strike) and three locomotor skills (run, dodge and vertical jump). The locomotor skills were selected based on evidence that children who are overweight or obese are less likely to demonstrate mastery of these skills compared with non-overweight children. The skills were taught with an emphasis on fun through games and maximum involvement for all the children. Most lessons focused on at least two skills, and each skill was a focus lesson in at least six or more sessions.	active. Health benefits of physical activity were also covered. Lessons 3 and 5 involved the children self-monitoring the time they spent in sedentary behaviors (TV viewing, electronic games and computer use) and physical activity, respectively. Lessons 6 and 7 raised children's awareness of the home and community environments in relation to their sedentary and physical activity choices and opportunities, through map drawing and photographic techniques. Lesson 8 involved teaching the children decision-making skills, such as weighing up the positives and negatives of	of the PE classes and PA activities outside of school hours.	nurse or a dietitian about a healthy lifestyle, focusing on reducing sedentary activities (watching TV and playing on the computer), promotion of outdoor play, and reduction of sugar-sweetened beverage intake and promotion of having breakfast daily.



Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
							choosing between being active or sedentary in a variety of different scenarios. In lessons 9 and 10, the children developed their own physical activities and games in which they could participate as an alternative to being sedentary. Lesson 11 involved teaching children about 'intelligent viewing', where the child selects the TV programs that he/she wants to watch and limits viewing to those programs. This is to encourage children to engage in selective, rather than 'vegetative' viewing or channel surfing. Children were given their first 'Switch-off Challenge' that involved completing and signing a contract pledging to		

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							switch off one TV program per week over the next 4 weeks. Children were to return the contract signed by parents each week. In lesson 12, the focus was on increasing children's awareness of the purpose of advertisements on TV. Lessons 13 to 16 focused on advocacy, with children writing their own scripts, performing plays and designing posters about choices to be active or sedentary based on real life situations. The children participated in physical activities that they could easily perform at home on their own, or with friends or siblings.		
Skybo, 2002 <sup>44</sup>	2	American Heart Association	Emphasize the importance of nutrition. Class		Discuss importance of exercise. Class discussions about	Children engaged in physical activities such as jumping jacks	Other :Education on heart function and living tobacco-		

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		Heart Power!  Length of intervention, weeks: 39  Setting: School Classroom education program to encourage heart healthy lifestyles including nutrition and physical activity and being smoke-free physical activity sessions.	discussions about the influence of external factors on nutrition. Instruction on the food pyramid. Group activity focusing on meal planning.  Target: Child  Delivery: Pediatric nursing students  Duration: 30 minutes  Frequency: once a week.		fitness. Children were encouraged to jump rope during recess  Target: Child  Delivery: Pediatric nursing students  Duration: 30 minutes  Frequency: once a week	or running in place.  Target: Child  Delivery: pediatric nursing students  Duration: 30 minutes  Frequency: once per week.	free		
Smolak, 2001 <sup>45</sup>	1	Other :No curriculum different schools						Other :parental involvement and training of teachers  Target: Parent/Caregiver, educator, delivery skilled nutritionist  Duration: Parents were informed during a parental school meeting. Teachers were trained within a half-day structured nutrition education program.	
Smolak, 2001 <sup>45</sup>	2	No curriculum same schools							

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		Length of intervention, weeks: NR Setting: School							
Smolak, 2001 <sup>45</sup>	3	Eating Smart, Eating for Me (ESEM)  Length of intervention, weeks: NR  Setting: School			Eating Smart, Eating for Me (ESEM Levine, Schermer, Smolak, & Etling, 1995), is a universal prevention program aimed, not at high risk or symptomatic children, but at elementary school children in general, as they are less likely than adolescents or adults to have actually developed problematic eating attitudes and behaviors.				Parents were also involved in the study. Meetings were organized whereby parents in the intervention group were given a file containing their child's screening results. Presentation on the importance of topics relevant to dietary and exercise habits of the children were issued. Parents were encouraged to modify their dietary habits as well as those of their children and support them in increasing their physical activity.
Sollerhed, 2008 <sup>46</sup>	2	I (Intervention) School  Length of intervention, weeks: 156  Setting: School The focus is on PE lessons	Target: Child			The intervention included an increase of allocated time for physical education in the I-school. The time was expanded from one or two lessons a week (one lesson=40 min, including change and shower) to four lessons, with every lesson being			

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						guaranteed to last for 40 min. Time for change and shower was not included in the 40 min. The four lessons were scheduled on 4 days. On the 5th day, classes had outdoor physical activities with their classroom teacher for about 1 h. One physical education lesson a week was performed with boys and girls separated, and the other lessons with both sexes. The quality of the lessons was emphasized when the project started, with attention on the variety of activities. Obese children had the possibility to have one extra voluntary lesson a week, with special attention paid to motor skills and self-esteem. The increase in physical education lessons was carried out by slight changes in allotment for different			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
						<p>school subjects and within the national curriculum. Physical education in the I-school was taught partly by a physical education teacher (half-time) and partly by ordinary classroom teachers who were not specially trained for physical education teaching. On the 5th day of the week, classes had outdoor physical activities with their classroom teacher for about 1 h.</p> <p>Target: Child</p> <p>Delivery: Teacher, PE teacher</p> <p>Duration:5</p> <p>Frequency: 40 sessions</p> <p>Comment: PE classes were 4 lessons a week for 40 mins. And one class of outdoor physical activity on the 5th day for about 1 hours with the classroom</p>			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
						teacher.			
Stenevi-Lundgren, 2009 <sup>47</sup>	2	Intervention School  Length of intervention, weeks: 52 Setting: School Focus was on Exercise intervention.	NA			The exercise intervention consisted of the ordinary PA used within the Swedish school physical education (PE) curriculum, supervised by school teachers (PE and classroom teachers), but increased to 40 min per day (total 200 min per week). This duration was chosen in order to maximize a range of health-related benefits beyond just bone mass which has been shown to respond to shorter bouts of weight-bearing exercise. PE classes did not consist of any programs specially designed to enhance muscle and bone mass or strength. Instead, the classes included both indoor and outdoor general physical activities, such as a variety of ball games (e.g., basketball, handball, and soccer), running,			

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						<p>jumping, and climbing activities (e.g., tag, rope climbing, and gymnastics related activities on various apparatus).</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 200</p> <p>Frequency: 5</p>			
Stock, 2007 <sup>48</sup>	1	Other :control, grades K-3						<p>Goal setting</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Self-evaluation was addressed by weekly goal setting and discussions of progress and problems with meeting activity goals. It is included in the self-management curriculum.</p>	<p>Arm 3 intervention (PE classes+ self-management curriculum) +in-service training program for classroom teachers (not described above). The in-service program (teachers taught by PE specialists) included the four components shown to be related to the successful adoption of a new curriculum: teacher appreciation of the benefits of the new program, skill specific training, administrative support, and group support with feedback. During the first year, eleven sessions were conducted, for a total of</p>



Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
									23 hours. During the second year, five sessions were conducted, for a total of 15 hours.
Stock, 2007 <sup>48</sup>	2	Control: Grades 4-7 Length of intervention, weeks: N/A						Goal setting  Target: Child  Delivery: certified PE specialists  Duration: Self-evaluation was addressed by weekly goal setting and discussions of progress and problems with meeting activity goals. It is included in the self-management curriculum.	The difference between arm2 and arm 3 is that arm2 was teacher-led and thus had a teacher in-service training program while arm 3 was specialist-led without training.
Stock, 2007 <sup>48</sup>	3	Intervention, gGades K-3  Length of intervention, weeks: 43  Setting: School focus on peer-based teaching about healthy living.	One of the three themes of the program: "go fuel!" centered on exposure and learning about nutritious and no nutritious foods and beverages, as well as learning about why we eat, energy balance and how the body uses fuel. Activities included memory card games, visual art projects and other			The second of three themes of the program: "go move!" centered on structured PA/aerobic fitness sessions called "fitness loops" where students were encouraged to exercise vigorously, using self-measured parameters of physical exertion. The buddy pairs would spend these sessions in the gym, which allowed the pairs to	Other within the "healthy living" focus of the program, theme 3: "Go feel good" was focused on healthy body image, self-esteem, and social responsibility. Students learned about valuing themselves and others based on who they and others are on the inside - addressed body-image,		

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			<p>exercises.</p> <p>Target: Child</p> <p>Delivery: older kids (4-7 grade) peer educated their K-3rd grade buddies</p> <p>Duration: 30 min</p> <p>Comment: During the first half of the year, the buddy pairs learned about how to be positive buddies and learned the 3 themes or components of a healthy life. The second half, they learned about the challenges to living a healthy life (e.g. the media) and how to overcome these obstacles.</p>			<p>participate simultaneously. There was also a school wide healthy-living theme day, midway through the year had each classroom prepare an activity and the buddy pairs rotate through them.</p> <p>Delivery: classrooms (children and teachers)</p> <p>Duration: 30</p> <p>Frequency: 2</p> <p>Other: school wide healthy-theme day occurred once midway through the year.</p>	<p>disordered eating issues (via teaching about healthy growth and development and media literacy). Fitness loops were designed for all levels of fitness for healthy body image development.</p>		
Stock, 2007 <sup>48</sup>	4	<p>Intervention, grades 4-7</p> <p>Length of intervention, weeks: 43</p> <p>Setting: School</p> <p>Focus on peer-</p>	<p>One of the three themes of the program: "go fuel!" centered on exposure and learning about nutritious and no nutritious foods and beverages, as well</p>			<p>The second of three themes of the program: "go move!" centered on structured PA/aerobic fitness sessions called "fitness loops" where students were encouraged to</p>	<p>Other within the "healthy living" focus of the program, theme 3: "Go feel good" was focused on healthy body image, self-esteem, and social responsibility.</p>	<p>Goal setting</p> <p>Duration: families attended evening meeting for 90 minutes for training in self-monitoring, setting realistic goals, problem-solving, self-rewarding goal achievement and supporting family and</p>	<p>All intervention sessions lasted a total of 90 minutes.</p>

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		based teaching about healthy living	<p>as learning about why we eat, energy balance and how the body uses fuel. Activities included memory card games, visual art projects and other exercises.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 45 min</p> <p>Frequency: 1</p> <p>Comment: During the first half of the year, the buddy pairs learned about how to be positive buddies and learned the 3 themes or components of a healthy life. The second half, they learned about the challenges to living a healthy life (e.g. the media) and how to overcome these obstacles.</p>			<p>exercise vigorously, using self-measured parameters of physical exertion. The buddy pairs would spend these sessions in the gym, which allowed the pairs to participate simultaneously. There was also a school wide healthy-living theme day, midway through the year had each classroom prepare an activity and the buddy pairs rotate through them.</p> <p>Delivery: classrooms (children and teachers)</p> <p>Duration: 30 minutes</p> <p>Frequency: 2</p> <p>Other: school wide healthy-theme day occurred once midway through the year.</p>	Students learned about valuing themselves and others based on who they and others are on the inside - addressed body-image, disordered eating issues (via teaching about healthy growth and development and media literacy). Fitness loops were designed for all levels of fitness for healthy body image development.	group members.	
Taylor, 2007 <sup>49</sup>	2	APPLE intervention	Encouraging healthy eating,	Nutrition-based initiatives were	Initiatives that encourage all children	Availability of a variety of sport and	Other :a novel interactive card		

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		Length of intervention, weeks: 104 weeks Setting: School Community-based demonstration project for schools.	nutrition based and focused on reducing the intake of sugary drinks and on increasing fruit and vegetable consumption. Science lessons highlighting the adverse health effects of sugary drinks, a community-based healthy eating resource, a novel interactive card game, and the provision of free fruit for 6 months. Target: Child Delivery: Community Activity Coordinators Duration: 8 hours a week.	particularly emphasized in the second year of the intervention and included the provision of cooled water filters in each school. Target: Child Delivery: Researcher Other: water filters in schools.	to be a little more physically active every day by increasing the variety and opportunities for physical activity beyond that which was currently provided in each school. They were used to increase non-curricular activity at recess, lunchtimes, and after school, with a particular focus on less traditional sports and more lifestyle-based activities such as outdoor games, household chores, gardening, beach hikes, and children's games from different countries.  Target: Child  Delivery: Other: Community Activity Coordinators  Duration: 8 hours per week.	play equipment at school breaks to enhance the level of "free" play in intervention children.  Target: Child  Delivery: Researcher	game		
Thivel, 2011 <sup>50</sup>	2	Intervention group- Physical exercise				In the intervention schools, a physical activity program was organized for 6 months (January to			

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		Length of intervention, weeks: 26  Setting: School focus on physical exercise.				June 2003). It consisted of 120 min (two times for 60 min) of supervised physical exercise in addition to 2 h of Physical Education classes per week. The additional 2 h per week of exercise were managed and taught by sports science students as part of their training they were themselves supervised by a member of the investigation staff. The sessions consisted of a 10-min warm-up followed by psychometric activities and exercises to improve coordination, flexibility, strength, speed, and endurance. The content of the program was designed to enhance pleasure and enjoyment during exercise, in order to encourage children's participation in PA during the			

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						<p>intervention but also to motivate them to maintain an active lifestyle on a long-term basis. The main objective of the sessions was to increase the time spent in PA and minimize inactivity.</p> <p>Target: Child</p> <p>Delivery: sports science students</p> <p>Duration: 120 minutes</p> <p>Frequency: 2 sessions per week</p>			
Trevino, 2005 <sup>51</sup>	2	<p>Bienestar Health Program</p> <p>Length of intervention, weeks: 34 weeks</p> <p>Setting: School</p> <p>A parent education and involvement program, a classroom health and physical</p>	<p>To decrease dietary fat, increase dietary fiber, increase physical activity and increase diabetic Knowledge</p> <p>Through bienestar parent fun activities (includes an instructor's manual and a parent's workbook), Bienestar health class (includes a teacher's physical &amp; health education</p>		<p>The purpose of the curriculum is to develop knowledge and skills necessary to engage in moderate and vigorous Physical activities. The Bienestar Health and Physical Education Program is classroom based and is made up of 16 complete ready-to-use lessons with sections on physical activity, nutrition, wellness, and diabetes. Curriculum</p>	<p>Bienestar health club (includes instructor's manual and student's workbook)- club is held after school and includes activities such games, dancing, singing, art crafts, puppet shows, and plays.</p> <p>Target: Child</p> <p>Delivery: San Antonio City Parks and Recreation department staff</p>			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		education curriculum, a student after-school health club, and a school cafeteria program.	<p>manual, a student's workbook, test, keys, transparencies, extensions, and other support material) and Bienestar school food service (includes an instructor's manual and a cafeteria staff workbook)</p> <p>Target: Child Parent/Caregiver</p> <p>Other: Cafeteria Staff</p> <p>Delivery: Teacher</p> <p>Duration: 20 min-2 hours</p> <p>Frequency: 5-6 Comment: Parent fun activities: 6 days a week (10am-12pm on Saturdays and weekdays between 5:30-6:30pm) Health class: 45 min per day/5 days a week School food</p>		<p>materials include a teacher's manual, children's workbook, transparencies, extensions for integrated thematic instruction, support materials, and test instruments with answer keys.</p> <p>Target: Child Parent/Caregiver</p> <p>Delivery: Teacher</p> <p>Other: San Antonio City Parks and Recreation department staff</p> <p>Duration: 45 min-2 hours</p> <p>Frequency: 1-5 Comment: Parent fun activities: 6 days a week (10am-12pm on Saturdays and weekdays between 5:30-6:30pm) Health class: 45 min per day/5 days a week Health club: 1 day a week for 1 hour</p>	<p>Duration: 60 min.</p> <p>Frequency: 1 Comment: Health club: 1 day a week for 1 hour</p>			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			service: 20min /5 days per week. 12 weeks in duration.						
Tucker, 2011 <sup>52</sup>	1	Other :Let's Go 5-2-1-0 Program curriculum ONLY							Additional details on how Kaledo is played are available in the paper. To give an idea of what the authors hoped to achieve from this board game intervention, a questionnaire evaluated the impact of Kaledo on nutrition knowledge, dietary intake and physical activity. The authors also note that Kaledo could affect dietary behavior by a knowledge-based and/or behaviorally focused nutrition education.
Tucker, 2011 <sup>52</sup>	2	Let's Go 5-2-1-0 Program curriculum and student nurse coaching, parent evening offerings, and reinforcement incentives  Length of intervention, weeks: 34  Setting: School	All children (control and intervention) received classroom delivery of the Let's Go 5-2-1-0 Program curriculum by the PHN. Intervention children also received 1:1 student nurse coaching, parent evening offerings, and reinforcement incentives. Nursing students were		All children (control and intervention) received classroom delivery of the Let's Go 5-2-1-0 Program curriculum by the PHN Intervention children also received 1:1 student nurse coaching, parent evening offerings, and reinforcement incentives.  Target: Child,				



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		Focus was on student nurse coaching after school hours.	<p>trained in the 5-2-1-0 curriculum and in motivational interviewing principles and skills. Coaching sessions were designed to occur after school hours at the location preferred by parent, or by telephone. EBS. The total number of sessions ranged from 1 to 12.5 sessions (15–75 min).</p> <p>HBS: Weekly sessions (range, 10–14) were held at the school (with the nursing faculty member present) during the lunch hour. 2 parent evening offerings were held during this project period.</p> <p>Target: Child, Parent/Caregiver</p> <p>Delivery: Nurses</p> <p>Duration: 15-75 mins</p>		<p>Parent/Caregiver</p> <p>Delivery: Nurses</p> <p>Duration: 15-75 mins</p> <p>Other: 1-12.5 sessions</p>				

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			Other: 1-12.5 sessions or 10-14 sessions						
Valdimarsson, 2006 <sup>53</sup>	2	POP study  Length of intervention: 43 weeks Setting: School Increased physical activity within the Swedish school curriculum				Increase of ordinary physical activity used within the Swedish School curriculum (increase from 60 min/week to 200 min/week)  Target: Child  Delivery: Teacher  Duration: 40 minutes  Frequency: 5			
Vandongen, 1995 <sup>54</sup>	2	Physical fitness  Length of intervention, weeks: 39  Setting: School classroom-based sessions and fitness program including physical activity sessions			Classroom sessions Aimed at providing rational basis for activity programs and exercise in general. The classroom session replaced the usual curriculum weekly health education. Resource package for teachers included daily lessons for entire year, strategies for teaching and monitoring intensity of exercises and methods of fitness testing. Teachers completed questionnaires at the	Fitness program included relays, skipping and health hustles. Heart rates of 150-170 beats/sec were to be achieved in 15 minutes of exercises and improvement of physical fitness as measured by leger test and the 1.6 km run.  Target: Child  Delivery: Teacher  Duration: 15 minutes			

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					<p>end of 4th term.</p> <p>Target: Child, Educator</p> <p>Delivery: Researcher, Teacher</p> <p>Duration: 30 minutes for classroom fitness education sessions</p> <p>Other: 6 classroom fitness education sessions</p>	<p>Other: every school day throughout the year</p>			
Vandongen, 1995 <sup>54</sup>	3	Physical fitness+ School nutrition Length of intervention, weeks: 39 Setting: School classroom-based physical activity and nutrition educational lessons, fitness program and teacher training.	Goals of nutrition program: 1) increase consumption of fruits/vegetables, whole grain breads and cereals relative to other foods 2) decrease consumption of fatty, sugary and salty foods relative to other foods 3) achieve an intake of not more than 33% of energy as fat and 12% as sugar while increasing fiber intake to at least 25grams per day. Nutrition education lessons aimed to		<p>Classroom sessions Aimed at providing rational basis for activity programs and exercise in general. The classroom session replaced the usual curriculum weekly health education. Resource package for teachers included daily lessons for entire year, strategies for teaching and monitoring intensity of exercises and methods of fitness testing. Teachers completed questionnaires at the end of 4th term.</p> <p>Target: Child, Educator</p>	<p>Fitness program included relays, skipping and health hustles. Heart rates of 150-170 bt/sec were to be achieved in 15 minutes of exercises and improvement of physical fitness as measured by leger test and 1.6-km run.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 15 minutes Other: fitness program offered for 15 minutes every school day throughout the year.</p>		<p>Other :avoiding smoking initiation Target: Child</p>	The details of the CATCH intervention are described elsewhere: Perry CL, Stone EJ, Parcel GS, et al. (1990) School-based cardiovascular health promotion: the child and adolescent trial for cardiovascular health (CATCH). J Sch Health 60:406-13.

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			<p>improve knowledge, attitudes and eating habits. Teachers attended in-service training session and were provided teaching resources including videos.</p> <p>Target: Child, Educator</p> <p>Delivery: Researcher, Teacher</p> <p>Duration: nutrition lessons: 10 lessons lasting one hour each.</p>		<p>Delivery: Researcher, Teacher</p> <p>Duration: 30 minutes per classroom-based fitness education session</p> <p>Other: 6 classroom-based fitness education sessions delivered.</p>				
Vandongen, 1995 <sup>54</sup>	4	<p>School nutrition</p> <p>Length of intervention, weeks: 39</p> <p>Setting: School nutrition education lessons for students, teacher training.</p>	<p>Goals of nutrition program: 1) increase consumption of fruits/vegetables, whole grain breads and cereals relative to other foods 2) decrease consumption of fatty, sugary and salty foods relative to other foods 3) achieve an intake of not more than 33% of energy as</p>						

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			fat and 12% as sugar while increasing fiber intake to at least 25grams per day. Nutrition education lessons aimed to improve knowledge, attitudes and eating habits. Teachers attended in-service training session and were provided teaching resources including videos.  Target: Child, Educator  Delivery: Researcher, Teacher  Duration: Duration (e.g., length of educational or counseling sessions): 10 one hour long nutrition lessons offered.						
Vandongen, 1995 <sup>54</sup>	5	School nutrition + Home nutrition  Length of intervention,	Goals of nutrition program: 1) increase consumption of fruits/vegetables, whole grain breads						The intervention group parents were invited to attend meetings, where they were lectured on the prevention of chronic diseases, especially

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		weeks: 39  Setting: School nutrition education lessons for students teacher training Home Nutrition education messages for children and parents.	and cereals relative to other foods 2) decrease consumption of fatty, sugary and salty foods relative to other foods 3) achieve an intake of not more than 33% of energy as fat and 12% as sugar while increasing fiber intake to at least 25grams per day. Nutrition education lessons aimed to improve knowledge, attitudes and eating habits. Teachers attended in-service training session and were provided teaching resources including videos. Home intervention: 5 nutritional messages presented using comic books delivered through schools. Comics had information for children and parents. Homework assignments where						ischemic heart disease and cancer.

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			<p>given to children and parents were asked to participate. It involved helping prepare healthy recipes etc.</p> <p>Target: Child, Parent/Caregiver, Educator</p> <p>Delivery: Researcher, Teacher</p> <p>Other: Parents</p> <p>Duration: (e.g., length of educational or counseling sessions): 10 one hour long nutrition lessons offered.</p>						
Vandongen, 1995 <sup>54</sup>	6	Home nutrition Length of intervention, weeks: 39 Setting: Home nutrition education messages for children and parents.	Home intervention: 5 nutritional messages presented using comic books delivered through schools. Comics had information for children and parents. Homework assignments were given to children						

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			and parents were asked to participate. It involved helping prepare healthy recipes etc.  Target: Child, Parent/Caregiver  Delivery: Researcher Other: Parents						
Viskic-Stalec, 2007 <sup>55</sup>	2	Experimental Group  Length of intervention, weeks: 34  Setting: School Focus was on rhythmic gymnastics, dance structures and aerobics.				Aerobics including Hi, Hi-lo, step, new body aerobics. Dance structures including folk dance staro sito, ducee and drmez, Social dances and Jazz dance. Rhythmic gymnastics including hops, jumps, turns etc.  Target:Child  Duration: 58 periods over the year.			
Vizcaino, 2008 <sup>56</sup>	2	Movi non-competitive physical activity program  Length of intervention:				Physical activity sessions included sports with alternative equipment (pogo sticks, frisbees, jumping balls, parachutes, and so on), cooperative			Primary care providers were encouraged to focus on the 5-2-1-0 behavioral targets for all patients during annual preventive care visits to assess patient readiness to change by asking



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		24 weeks  Setting: School School's athletic facilities.				games, dance and recreational athletics. Each 90-min session included 15 min of stretching, 60 min of aerobic resistance and 15 min of muscular strength/resistance exercises. On average, these exercises required physical activity of moderate intensity throughout the 90 min of each session.  Target: Child  Delivery: Teacher  Duration: 90minutes  Frequency: 3 sessions/ week.			questions related to the importance of and confidence in making change to promote self-management skills with patients and to assist patients with setting self-management goals for behavior change. Practice teams were encouraged to develop clinical information systems to track outcomes and improve care they were provided an Excel- or Access-based overweight population registry developed by the MYOC and NICHQ.
Walter, 1985 <sup>57</sup>	2	"Know Your Body" group  Length of intervention: 34 weeks  Setting: School Focus is on nutrition, physical fitness, and	Each activity is designed to incorporate five social learning strategies to encourage behavior change: namely, modeling of desired behaviors, behavioral rehearsal, goal		The physical fitness component of the curriculum focuses on the adoption of a regular program of endurance exercise designed to improve cardiovascular fitness.  Target: Child  Delivery: Teacher				

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		cigarette smoking prevention.	<p>specification, feedback of results, and reinforcement for favorable behavior change. The nutrition component of the curriculum focuses on the adoption of the American Heart Association "prudent diet" (30) Specifically, on maintenance of ideal body weight, decreased consumption of total and saturated fat, cholesterol, sodium, and refined sugar, and increased consumption of complex carbohydrates and fiber.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 2 hours/week</p> <p>Comment: duration and number of individual session</p>		<p>Duration: 2 hours/week</p> <p>Comment: The total of both the parts of intervention should be 2 hours in a week.</p>				

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			is not mentioned.						
Walther, 2009 <sup>58</sup>	2	<p>Intervention group (daily school exercise lessons)</p> <p>Length of intervention, weeks: 52</p> <p>Setting: School daily PE lessons.</p>				<p>1 unit of physical exercise (45 minutes)with at least 15 minutes of endurance training per school day</p> <p>Target: Child</p> <p>Duration: 45 minutes/session</p> <p>Frequency: 5 sessions/week (assume school day is 5 days/week).</p>			
Walther, 2009 <sup>58</sup>	3	<p>Reference group</p> <p>Length of intervention, weeks: 52</p> <p>Setting: School competitive sports and Physical education.</p>				<p>The nonrandomized sport students (reference group) received 12 units (45 minutes per unit) of high-level endurance exercise training per week and frequently participated in competitive sporting events, thus representing a maximum of physical fitness attainable under reasonable conditions in school-age children</p> <p>Target: Child</p>			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
						Duration: 45 minutes/session  Frequency: 12 sessions /week.			
Warren, 2003 <sup>59</sup>	1	Other: Be smart educational program about food in non-nutrition sense.							
Warren, 2003 <sup>59</sup>	2	Eat smart  Length of intervention, weeks: 20 weeks  Setting: School Classroom sessions Home Homework and parental involvement.	Eat smart Educational intervention emphasizing food contributing to health, promoting fruits and vegetables, high starch foods concentrating on breakfast and snacking and tooth friendly foods.  Target: Child  Delivery: Researcher  Duration: weekly in term 1 and fortnightly in terms 2-4.						
Warren, 2003 <sup>59</sup>	3	Play smart  Length of			Play smart physical activity educational program was designed				

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		intervention, weeks: 20 weeks  Setting: School classroom sessions Home Homework and parental involvement.			to promote activity in daily life, promotion of activity in the playground and a reduction in television viewing.  Target:Child  Delivery: Researcher  Duration: weekly in term 1 and fortnightly in terms 2–4				
Warren, 2003 <sup>59</sup>	4	Eat smart play smart Length of intervention, weeks: 20 weeks  Setting: School Classroom sessions Home home work and parental involvement.	Eat Smart Play smart Children in this group received half of the nutritional education and half of the physical activity program each term.  Target: Child  Delivery: Researcher  Duration: weekly in term 1 and fortnightly in terms 2–4		Eat Smart Play smart Children in this group received half of the nutritional education and half of the physical activity program each term.  Target: Child  Delivery: Researcher  Duration: weekly in term 1 and fortnightly in terms 2–4				Participants receive “Bienestar coupons” for purchase of merchandise (donated clothes, household appliances, school supplies, toys, and gift certificates) at a school store.
Lubans, 2012 <sup>28</sup>	2	PALs multi-component school based intervention	Nutritional handbooks and seminars		handbooks and seminars  Target: Child	Sport sessions and lunchtime activities  Target: Child		Intervention: Pedometer, leadership sessions  Target: Child	Multi-component school based intervention that included: sport sessions, physical activity and

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		<p>Length of Intervention (weeks): 24</p> <p>Setting: School: six, low SES secondary schools in New South Wales, Australia</p>	<p>Target: Child</p> <p>Delivery: Teacher, handbooks</p> <p>Duration: 30 minutes</p> <p>Frequency: 3 times per 24 weeks</p> <p>Comments: 3 interactive sessions during intervention period of 24 weeks</p>		<p>Delivery: Teacher handbooks</p> <p>Duration: 30 minutes</p> <p>Frequency: 3 times per 24 weeks</p> <p>Comments: 3 interactive sessions during intervention period of 24 weeks</p>	<p>Delivery: Teacher</p> <p>Duration: 90 min for sport sessions and 30 minutes for lunchtime activity sessions</p> <p>Frequency: 10x and 3x</p> <p>Comments: School sport sessions were conducted 10 times during intervention at 90 min per session. Lunch time activities were conducted 8 times at 30min each.</p>		<p>Delivery: Teacher</p> <p>Comments: Pedometers were used 5 days a week for duration of intervention (6 months. Physical activity leadership sessions were done 6 times during intervention at 30 min each, Physical activity leadership: participants were required to recruit and instruct grade 7 students on how to safely use exercise/training devices.</p>	<p>nutrition handbooks, interactive seminars, lunch-time activities, leadership sessions and pedometers.</p>
Llargues, 2012 <sup>27</sup>	2	<p>IVAC educational pedagogy</p> <p>Length of Intervention (weeks): 80 weeks</p>	<p>Program to help students develop activities related to health food habits</p> <p>Developing posters, food tables, games, crafts, cooking workshops and educational information was given.</p> <p>Target: Child</p> <p>Delivery: Teacher</p>		<p>Program to help students develop activities related to physical activity: Developing posters, games, craft and promotion of playground games. Also, educational information was given.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Frequency: a total of 3hrs/week were used</p>				

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			Frequency: a total of 3hrs/week were used for intervention		for intervention Comments:				
Rosario, 2012 <sup>39</sup>	2	<p>Nutrition program</p> <p>Length of Intervention (weeks): 24 weeks</p> <p>Setting: School: Nutrition education program delivered by teachers in the classroom</p>	<p>Teachers addressed various nutrition topics via classroom activities. Topics included key concepts in food and nutrition, dietary guidelines, healthy eating advice, food groups, meal planning, healthy beverage and food choices, and healthy cooking.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Frequency: Intervention lasted 6 months, but not clear regarding frequency or duration of each classroom activity.</p> <p>Comments: Teachers of the intervention group had 12 3-hour</p>		<p>Teachers addressed various physical activity/lifestyle topics via classroom activities. The topics included appropriate physical activity levels and reducing screen exposure time.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Frequency: Intervention lasted 6 months, but not clear regarding frequency or duration of each classroom activity.</p> <p>Comments: Teachers of the intervention group had 12 3-hour sessions during the 6 months, led by researchers, which provided in-service training regarding nutrition and physical activity topics that the teachers would then teach the children in the classroom.</p>				

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			sessions during the 6 months, led by researchers, which provided in-service training regarding nutrition and physical activity topics that the teachers would then teach the children in the classroom.						
Fung, 2012 <sup>14</sup>	2	APPLE School  Length of Intervention (weeks): 104  Setting: School: Instructional and non-instructional time, professional development, parent nutrition nights, after school activity, weekend events, newsletters		School Health Facilitators promoted community and parent involvement that led to community gardens, support for breakfast and lunch programs. School Health Facilitators contributed to the schools' health curriculum, both during instructional and none-instructional school time, engaged in developing cross curriculum links and taught across the curriculum. They facilitated		School Health Facilitators promoted after school physical activity programs and walk-to-school days and facilitated professional development for teachers. All 10 APPLE Schools adopted policies ensuring all their students receive a minimum of 30 minutes of physical activity per school day.			Weekend events and celebrations, and circulated newsletters, and parent led extramural programs also took place, but it wasn't clear if they were dietary or activity-related. It is unclear how much of each of these interventions was actually done--the major intervention seems to be the presence of the School Health Facilitator in the APPLE schools.



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				professional development days for teachers and school staff, organized parent information nights, nutrition programs such as cooking clubs. 8 of the 10 APPLE Schools implemented a nutrition policy.  Target: Child Parent/Caregiver					
Klish, 2012 <sup>25</sup>	2	Length of Intervention (weeks): NR  Setting: School		Target: NR Delivery: NR	Target: NR Delivery: NR Duration: NR Frequency: NR				
Coleman, 2011 <sup>8</sup>	2	Healthy ONES Length of Intervention (weeks): 104 Setting: School: Changes take place in the classroom, before/after school, at recess and in the cafeteria Aim at policy change: Yes	Unhealthy snacks brought from home discouraged by teachers, Staff proactively discouraging students from consuming unhealthy snacks during recess, Cafeteria monitors proactively discouraging unhealthy food/beverages from home, Encouraged	Treasure chests filled with nonfood rewards for 4th and 5th grades, Healthy food/beverages and nonfood items for classroom celebrations, Nutrition Services catered meals for classroom parties, Created healthier menu for after school snack, Changed PTA fundraising to					

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			parents to try meals to demonstrate they were healthful and flavorful, Teachers promoting HE messages in classroom, Teachers proactively discouraging students from bringing unhealthy snacks to school, Teachers informing parents of school healthy celebration and snack policy, Staff not consuming unhealthy food and beverages in front of students, Staff participating in parent nutrition meetings, Staff participating in student chef clubs/cooking classes, Staff participates with students in the fruit at recess program, Staff choosing to eat the school lunch, Staff encouraging their	include nonfood events i.e. Jog-A-Thons, Traditional carnival activities became healthy i.e. cake walk to prize walk, Removed unhealthy foods from PTA sponsored event menus i.e. nachos, candy, Added fruits, vegetables and complete meal options to PTA event menus, Partnered PTA with Nutrition Services to cater healthy foods for events. Recess, implemented daily fruit at recess program, “Healthy & Unhealthy” snack poster displayed, Removed perceived unhealthy items from menu i.e., nachos, cinnamon bun, chocolate milk, Exclusive use of nonfood					

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			<p>students to eat/try fruits and vegetables, Staff supporting nutrition services changes by encouraging children to eat school meals</p> <p>Target: Child Parent/Caregiver</p> <p>Delivery: Teacher</p>	<p>rewards by custodian and cafeteria staff for student helpers, Added healthier, in-house prepared entrées to menus, Catered healthy meals for classroom celebrations, Include nonfood item as part of meal for extra celebration, Before/After School, Created healthier menu for after school snacks, Catered healthy menu items for after school events and celebration, Supported student chef clubs/student cooking classes, Recess, Provide cut fresh fruit at recess, Increased student ability to consume fresh fruits and vegetables, Advertising/market ing of approved healthy snack and</p>					

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
				beverages only, Student taste tests of new menu items, Free meal for staff who eat school lunches with students, Staff provided with thermal mugs to conceal caffeinated beverage consumption  Target: Child  Parent/Caregiver  Delivery: Teacher					
Burguera, 2011 <sup>5</sup>	2	ACTYBOSS Length of Intervention (weeks): 24 weeks  Setting: School: public school	Participants were offered 2 nutritional and 2 behavioral modification workshops during the intervention period. The topics were: i) How to eat healthy? ii) Influence of the mass media on what we eat. iii) Impact of physical activity on body and brain development. iv) Build up our self-esteem. Children		Put a special emphasis on motivating and informing the children about the benefits of a healthy lifestyle, highlighting the fact that they needed to be responsible for their own health  Target: Child  Delivery: Teacher  Duration: <3 hours  Frequency: 4/week Comments: Did not	Opportunity to participate in enjoyable, noncompetitive sports and physical activities (team sports, racket games as well as dancing and music games).  Target: Child  Delivery: Teacher  Duration: <3 hours  Frequency: 4/week			Did not state if the after-school physical activity component was required. Motivated students to attend with the opportunity to win prizes: "the gifts included entrance tickets for sport events, sport equipment, trips, entrance tickets for leisure parks, cinema and bowling tickets, and others."

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			<p>received 100 points for each session they attended to. Parents/tutors offered 2 nutritional conferences. i) How to cook a healthy meal? ii) Benefits of the Mediterranean diet.</p> <p>Target: Child Parent/Caregiver</p> <p>Frequency: 6 workshops in total</p>		state how often there was a psychosocial intervention during the after-school program.				
Burguera, 2011 <sup>5</sup>	3	<p>Usual Care School #2</p> <p>Length of Intervention (weeks): NR</p> <p>Setting: School:</p>	<p>Participants were offered 2 nutritional and 2 behavioral modification workshops during the intervention period. The topics were:</p> <p>i) How to eat healthy?</p> <p>ii) Influence of the mass media on what we eat.</p> <p>iii) Impact of physical activity on body and brain development.</p> <p>iv) Build up our self-esteem.</p> <p>Children received 100 points for each</p>		<p>Put a special emphasis on motivating and informing the children about the benefits of a healthy lifestyle, highlighting the fact that they needed to be responsible for their own health</p> <p>Target: Child, Teacher</p> <p>Duration: &lt;3 hours per week</p> <p>Frequency: 4</p>	<p>Opportunity to participate in enjoyable, noncompetitive sports and physical activities (team sports, racket games as well as dancing and music games).</p> <p>Target: Child, Teacher</p> <p>Duration: &lt;3 hours per week</p> <p>Frequency: 4</p>			<p>This group was defined as "children who took part in the intervention but their level of attendance was less than 3 h per week."</p>

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			<p>session they attended to.</p> <p>Parents/tutors offered 2 nutritional conferences. i) How to cook a healthy meal? ii) Benefits of the Mediterranean diet.</p> <p>Target: Child Parent/Caregiver</p> <p>Frequency: max of 6 sessions</p>						
DeBar, 2011 <sup>10</sup>	2	<p>Public Commitment to HEALTHY Intervention</p> <p>Length of Intervention (weeks): 104</p> <p>Setting: School</p>	<p>1 hour initial training that outlined the required tasks, skills, and procedures (nutrition, PA, behavior and communications). Included the voluntary recitation of the following pledge: "I promise to be a HEALTHY leader in my school. I will learn about being HEALTHY and share what I learn with my</p>		<p>1 hour initial training that outlined the required tasks, skills, and procedures (nutrition, PA, behavior and communications). Included the voluntary recitation of the following pledge: "I promise to be a HEALTHY leader in my school. I will learn about being HEALTHY and share what I learn with my friends, my school, my family and my community. I will be positive and encouraging. I will set an example to the best</p>			<p>Communications intervention strategies, including public commitment opportunities for students, were intended to strengthen the impact of all HEALTHY intervention components.</p>	<p>Participation was voluntary and the number of SPCs at each school depended on school size and other local considerations. SPCs were selected through a combination of self- and peer-nomination. The SPC was seen as a potential "influencer" or one who was able to promote key study messages in a meaningful way to peers.</p>

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			<p>friends, my school, my family and my community. I will be positive and encouraging. I will set an example to the best of my ability by living well in every way. I am HEALTHY!"</p> <p>plus supplemental 30-minute trainings specific to each intervention activity in which each SPC participated Target: Child</p> <p>Delivery: Researcher</p>		<p>of my ability by living well in every way. I am HEALTHY!"</p> <p>plus supplemental 30-minute trainings specific to each intervention activity in which each SPC participated Target: Child</p> <p>Delivery: Researcher</p>				
Rush, E, 2012 <sup>40</sup>	2	Interventions were designed to help reduce excess weight gain and risk of chronic disease, through 'team Energize' staff who 'modelled' classes and support the usual class teacher through fundamental	<p>Energizer educated through provision of information on the benefits of replacing of sugary drinks with water and milk, the importance of eating breakfast, and modeling the preparation of healthy lunches and snacks on a budget.</p> <p>Target: Child</p>	<p>Energizers assisted each school with a range of healthy-eating initiatives. These included canteen makeovers to remove pastry-based pies and 'big cookies' and add filled rolls, fruit and low-fat yogurt. Healthy fund raising was promoted with</p>	<p>Education through ideas for 'huff and puff' fitness activities, modified games, and ball activities and sport-related games, where keeping children moving as much as possible throughout each session was the focus. Energizers also promoted active transport, lunchtime games, bike days and leadership training for students to be leaders</p>	<p>Activities targeted the local community through events such as gala open days and edible gardens</p> <p>Target: Child Community</p> <p>Delivery: Team Energizer staff</p>			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		movement skill training, ideas for 'huff and puff' fitness activities, modified games, and ball activities and sport-related games, where keeping children moving as much as possible throughout each session was the focus. Length of Intervention (weeks): 104 Setting: School Classes were modeled through fundamental movement skill training, ideas for 'huff and puff' fitness activities, modified games, and ball activities and sport-related games, where keeping	Comments: parents were encouraged to attend three information-based sessions, which included a 45 min practical nutrition class	sales of water, milk, soup, bread rolls, fruit and non-food items instead of chocolate, sweets, sausages and sugary drinks.  Target: Schools  Delivery: Team Energizer staff	of physical activities before and after school.  Target:Child  Delivery: Team Energizer staff				



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		children moving as much as possible throughout each session was focused on nutrition education Home: There was also a home–school link Community: Activities also targeted the local community through events such as gala open days and edible gardens							
Magnusson, 2012 <sup>31</sup>	2	Physical activity and healthy diet intervention  Length of Intervention (weeks): 104 weeks  Setting: School	The dietary intervention was designed to target dietary knowledge, awareness, preferences/taste, self-efficacy and parental influence. Nutrition education material was developed for the intervention and implemented during the latter intervention year in			Teachers integrated physical activity into the diverse subjects of the curriculum. This included more frequent outdoor teaching, organized fieldtrips, promotion of active commute to and from school, one extra physical education (PE) lesson per week (three 40-min sessions per week instead of two			The intervention was a teacher-led daily implementation of various intervention tactics, which were introduced and discussed during bimonthly meetings (for about 2-3 hours) led by the research team. During these meetings, the researchers, the teachers and principals of the participating intervention schools

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			collaboration with teachers of the intervention schools.  Target: Child  Delivery: Teacher  Comments: As part of the intervention, there was a nutritional teaching kit which comprised books, Digital Versatile Discs (DVDs).			compulsory 40-min sessions at the control schools) and more.  Target: Child  Delivery: Teacher  Comments: The three intervention schools received a physical activity teaching kit which comprised books, Digital Versatile Discs (DVDs) and equipment to use both inside the classroom and for outdoor play at their will. The teachers held a log-book which they used to keep track of all the different activities they performed with the children during each week of the 2-year intervention period.			exchanged on ideas and updates of the intervention progression.
Resaland, 2011 <sup>62</sup>	2	Daily 60 min PA session Length of Intervention (weeks): 104				Intervention consisted of 60min of physical activity conducted by a specialist PE teacher with 15 min of rigorous physical			

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		Setting: School: PA sessions conducted during school hours				activity per session.  Target: Child  Delivery: Teacher  Duration: 60min per session  Frequency: one session per day			
50731	2	Hellison's Teaching Responsibility through Physical Activity model (TRPA)  Length of Intervention (weeks): 65 weeks (15 months)  Setting: School: Physical education teachers provided assistance for students in planning their out-of-school leisure time physical			Physical education teachers provided social support and reinforcement for students and their self-programmed out-of-school physical activity plan.  Target: Child  Delivery: Teacher  Frequency: Evaluation sessions every 2 weeks for 15 months, but not clear how long/how often social support/reinforcement was provided.			Intervention: Goal setting  Target: Child  Delivery: Teacher  Comments: The experimental group pupils were given the responsibility for the accuracy of the plans and its accomplishments as a part of Hellison's model of TRPA. Those pupils who fulfilled the PA obligations in the way they had committed themselves earlier in the planner, received a reward – an extra top grade once every two weeks.	"A specially self-designed, personalized planner' 'Planning Form of Leisure time Physical Activity' 'was used for self-programming of the out-of-school PA activity schedule. In this planner, every pupil planned the amount of time and forms of weekly PA hours they voluntarily committed to undertake during their out-of-school leisure time for each two week period." Does this meet the criteria for a school-home study?

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		activity. Home: Students performed out-of-school leisure time physical activity. Community: Students performed out-of-school leisure time physical activity.							
Howe, 2011 <sup>20</sup>	2	PA Intervention- Attended  Length of Intervention (weeks): 40  Setting: School: After-school program				After school program which included 25 minutes of skills development (e.g., how to dribble a basketball), 35 minutes of VPA, and 20 minutes of toning and stretching with 5 minutes rest between each component. Activities during the VPA component included games such as, basketball, tag, softball, and relay races, all of which were modified to keep all the boys sufficiently active (≥150 bpm) throughout the 35-			Intervention is more fully described here: P. Barbeau, M. H. Johnson, C. A. Howe et al., “Ten months of exercise improves general and visceral adiposity, bone, and fitness in black girls,” Obesity, vol. 15, no. 8, pp. 2077–2085, 2007. This group attended >60% of the activities

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						<p>minute period</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 80</p> <p>Frequency: 5</p>			
Howe, 2011 <sup>20</sup>	3	<p>PA Intervention- Did not attend</p> <p>Length of Intervention (weeks): 40</p> <p>Setting: School: After school program</p>				<p>After school program which included 25 minutes of skills development (e.g., how to dribble a basketball), 35 minutes of VPA, and 20 minutes of toning and stretching with 5 minutes rest between each component. Activities during the VPA component included games such as, basketball, tag, softball, and relay races, all of which were modified to keep all the boys sufficiently active (<math>\geq 150</math> bpm) throughout the 35-minute period</p> <p>Target: Child, Teacher</p> <p>Duration: 80</p>			This group attended less than 60% of the activities

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						Frequency: 5  Comments: Attended less than 60% of the activities listed here.			
Lubans, 2012 <sup>29</sup>	2	<p>Length of Intervention (weeks): 52</p> <p>Setting: School Focus on PA, nutrition, classroom workshops, environmental ints. to promote PA, home: parent newsletter.</p> <p>Community: Health Informatics: text messaging for social support</p>	<p>Nutrition workshops, interactive sessions on healthy eating benefits parents were sent newsletters that included encouragement to support their child's dietary behaviors child also got supportive text messages re: diet</p> <p>Target: Child Parent/Caregiver</p> <p>Delivery: Researcher Clinician</p> <p>Frequency: 3; Each consisting of nutrition workshops with dietitians, interactive sessions with research staff newsletters were sent out 4x during the 12 months texts were sent weekly</p>		<p>Enhanced sport sessions included an informational component for the first school term. Parent newsletters also promoted PA child also got supportive text messages re: PA</p> <p>Target: Parent/Caregiver Child</p> <p>Delivery: Teacher</p> <p>Duration: 10-15 minutes of the larger 60-80 minute session</p> <p>Frequency: newsletters were sent out 4 times during the 12 months text messages were sent weekly during term 2 and 3, biweekly during term 4.</p>	<p>Enhanced sport sessions, lunchtime PA sessions</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 60-80 minutes</p> <p>Frequency: NR</p> <p>Comments: range of PA activities organized into 4 week units, for the first school term, included 10-15 minutes of an informational session delivered by teachers</p>	<p>Target: Child</p> <p>Delivery: Researcher</p> <p>Comments: text messages were sent weekly in term 2 and 3, biweekly during term 4, text messages were mixed or simultaneously addressed multiple components of the intervention (PA, Nutr, sedentary activity)</p>	<p>Intervention: Pedometer, teacher professional development</p> <p>Target: Child</p> <p>Delivery: Researcher</p> <p>Comments: pedometers &amp; handbooks were given out for self-recording teachers that served as school champions for the program (e.g. responsible for the program's delivery) participated in a 1-day training workshop.</p>	Control group was provided with equipment packs and a condensed version of the intervention following the completion of 24-month assessments.

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			during terms 2&3, bi-weekly during term 4.  Comments: interactive sessions were for healthy eating and PA						
Llargues, 2012 <sup>66</sup>	2	Promoting healthy dietary habits and increasing physical activity through the educational pedagogy Investigation, Vision, Action and Change (IVAC)  Length of Intervention (weeks): 104  Setting: School Focus on classroom teaching children health strategies who then used their perception and knowledge to make changes with moderations	The IVAC method is used in health strategies because the perception and knowledge elaborated by school children are directed towards change, so that they make their own decisions based on their concepts of health, determination of priorities, and change. School children investigate and reflect on how lifestyle, environment, and society affect their health. Teachers act as moderators in conversations between school children and help them develop the skills they need to be able to change						

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/ environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/ environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		from teachers to help them develop skills needed to make changes.	these conditions.  Target: Child  Delivery: Teacher  Comments: No mention was made on the frequency of intervention.						

APPLE = Alberta Project Promoting active Living and healthy Eating; BMI = Body mass index; CATCH = Child and Adolescent trial for cardiovascular health.; EHS = Elton Hills Elementary School; FMS = Fundamental Motor Skills; GI = Intervention Group; GINo = Non obese intervention group; GIOb = Obese children intervention group; HBS = Harriet Bishop Elementary School; INT = Intervention; IVAC = Investigation; Vision; Action and Change; MVPA = Moderate vigorous Physical activity; MYOC = Maine Youth Overweight Collaborative; NICHQ = National Initiative for Children’s Healthcare Quality; NR = Not reported; PA = Physical activity; PAAC = Physical Activity Across the Curriculum ;PE = Physical Education; PFGM = Project Familia Giya Marianas; PHN = Public Health Nurse; SPC = Student Peer Communicators; WSB = Walking School Bus



Evidence Table 4a. Weight related outcomes for diet intervention studies taking place in a school only setting

Author, Year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)	Measure of Association
BMI (Kg/m2)																
James, 2007 <sup>22</sup>	1	NR	17.5(2.36)	52	NR	18.3 (2.85)	0.71 (1.45)	156	215	19.7(3.36)	2.14 (1.64)					No significant difference in change in BMI from baseline between the two groups. At 12 months mean difference= 0.10, 95% CI: 0.00 to 0.21, p=0.06. Final point estimate mean difference= 0.26, 95% CI: -0.07 to 0.58 p=0.12
	2	NR	17.2(2.14)	52	NR	17.8 (2.45)	0.62 (0.79)	156	219	19.0 (3.21)	1.88 (1.71)					
James, 2004 <sup>21</sup>	1	304	17.6(0.7)	26								52	279	18.3 (0.8)	0.6	Grp2-G1 change in BMI: 0.13  95% CI: -0.08 to 0.34
	2	311	17.4(0.6)	26								52	295	17.9 (0.7)	0.5	
BMI, z-score																
James, 2007 <sup>22</sup>	1	NR	NR	52	NR		0.05 (0.57)	156			0.10 (0.53)					
	2	NR	NR	52	NR		0.03 (0.30)	156			-0.01 (0.58)					
James,	1	304	0.47(0.20)									52	279	0.60	0.08 (0.13)	Grp2-G1

Author, Year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)	Measure of Association
2004 <sup>21</sup>														(0.19 )		b/w diff in change in BMI z-score; 0.04 95% CI: -0.04 to 0.12
	2	311	0.50(0.23)									52	295	0.48 (0.23)	-0.04 (0.07)	
James, 2007 <sup>22</sup>	1	NR	0.53 (0.98)	52	NR	0.63(1.07)		156	215	0.63(1.12)						G2-G1 Mean difference; 0.20 (0.01 to 0.38) p value 0.04 (After 12months) 0.24 (0.02 to 0.46) p value 0.03 (after 3years follow up)
	2	NR	0.44 (0.98)	52	NR	0.44(1.01)		156	219	0.39(1.17)						
<b>Prevalence of Overweight/ Obesity</b>																
James, 2007 <sup>22</sup>	1	NR	20.6	52	NR	28.5		156	215	30.2					9.6	Final point estimate odds ratio= 0.79, 95% CI:0.52 to 1.21, p=0.28
	2	NR	17.4	52	NR	18.7		156	219	25.6					8.2	
James, 2004 <sup>21</sup>	1	304	19.4% (8.4)	26								52	279	26.9% (8.0)  95% CI: 12.3 to 7.5%	7.5	Grp2-G1 change in % of overweight 7.7 95% CI: 2.2 to 13.1

	2	311	20.3% (6.3)	26								52	295	20.1% ( 6.3)	-0.2	
95% CI: 6.7 to - 0.2%																
Change in Waist circumference cm																
James, 2007 <sup>22</sup>	1			52	NR	0.08(0.64)		156	NR	0.099 (0.99)					0.19	Final point estimate adjusted mean difference= 0.09, 95% CI: -0.06 to 0.26, p= 0.25
	2			52	NR	0.08(0.47)		156	NR	0.01(0.66)					-0.07	

CI = Confidence Interval; Grp2-G1 = Difference in means between group2 and group1; kg/m<sup>2</sup> = kilogram per meter squared; N = Sample Size; NR = Not Reported; P = p-value; SD = Standard Deviation

Evidence Table 4b. Weight related outcomes for diet intervention studies taking place in a school only setting, by subgroup

Author, Year	Arm	Sub-group	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up mea-sure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of Association
<b>BMI</b>																	
Vandongen, 1995 <sup>54</sup>	1	Boys	78	18.1 CI: 17.5-8.6	39	78	18.2 CI: 17.6-18.8									0.1	There was no significant difference between groups with respect to BMI.
	2		91	18 CI: 17.5-18.5	39	91	18.5 CI: 17.9 -19									0.5	
	3		58	18.2 CI: 17.4-19	39	58	18.4 CI: 17.6 -19.2									0.2	
	1	Girls	67	17.6 CI: 16.9-18.3	39	67	18.2 CI: 17.4 -18.9									0.6	There was no significant difference between groups with respect to BMI.
	2		108	17.5 CI: 17-17.9	39	108	18 CI: 17.5-18.5									0.5	
	3		68	17.5 CI: 16.8-18.2	39	68	17..8 CI: 17.1-19.4									0.3	
<b>Obese prevalence (IOTF cut off points)</b>																	

Author, Year	Arm	Sub-group	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of Association
James, 2004 <sup>21</sup> obese prevalence (based on 1990 British centile charts) James, 2004 <sup>21</sup>	1	boys	144	3 (1.7)					52	134	3 (1.7)						At 12 months the mean percentage of overweight and obese children increased in the control clusters by 7.5%, compared with a decrease in the intervention group of 0.2% (mean difference 7.7%, 2.2% to 13.1%;
	2		160	7 (4.1)					52	156	6 (3.5)						
	1	girls	160	12 (7.3)					52	145	11 (6.3)						
	2		151	9 (5.7)					52	139	8 (4.7)						
	1	boys	144	10 (7.0)					52	134	12 (9.0)						
	2		160	11 (6.9)					52	156	11 (7.1)						
	1	girls	160	12 (7.5)					52	145	13 (9.0)						
	2		151	10 (6.6)					52	139	9 (6.5)						
Obese prevalence (based on British waist circumference centile charts) James, 2004 <sup>21</sup> overweight prevalence (IOTF cut off points) James, 2004 <sup>21</sup>	1	boys	144	14 (9.9)					52	134	14 (10.4)						NR
	2		160	15 (9.5)					52	156	13 (8.4)						NR
	1	girls	160	17 (10.7)					52	145	27 (19.0)						NR
	2		151	15 (9.9)					52	139	16 (11.5)						NR
	1	boys	144	33 (18.8)					52	134	39 (22.2)						NR
	2		160	34 (20.1)					52	156	31 (18.3)						NR
	1	girls	160	46 (28.0)					52	145	50 (29.6)						NR
	2		151	43 (27.6)					52	139	39 (23.1)						NR
	1	boys	144	28 (19.6)					52	134	33 (25.6)						NR
	2		160	32 (19.2)					52	156	31 (19.9)						NR
	1	girls	160	32 (20.1)					52	145	37 (28.3)						NR
	2		151	29 (19.2)					52	139	29 (20.9)						NR
	1	boys	144	28 (20.3)					52	134	33 (25.0)						NR
	2		160	34 (21.5)					52	156	35 (22.6)						NR
	1	girls	160	38 (24.4)	26				52	145	52 (36.9)						NR
	2		151	33 (22.1)	26				52	139	40 (29.6)						NR

BMI = Body Mass Index, CI = Confidence Interval, N = Sample Size; NR = Not Recorded, IOTF = International Obesity Task Force, SD = Standard Deviation

**Evidence Table 4c. Clinical outcomes for diet intervention studies taking place in a school only setting, subgroups**

Author, year	Arm	Subgroup	Baseline N	Baseline measure, mean SD)	Final measure timepoint	N at final measure	Final followup measure, mean SD)	Mean Change from baseline SD)	Measure of association
<b>SBP</b>									
Vandongen, 1995 <sup>54</sup>	1	Boys	78	106.6 CI: 104.9-108.3	Other	78	102.5 CI: 100.1-104.9		There were no significant differences in change in SBP
	4		91	105.3 CI: 103.8-106.7	39	91	101.9 CI: 100 -103.8		
	5		58	106.1 CI: 104.4-107.8	Other	58	101.8 CI: 99.6-104.0		
	6		97	105.5 CI: 103.8-107.3	39	97	102.6 CI: 100.8-104.3		
	1	Girls	67	105.9 CI: 104.1-107.7	Other	67	103.1 CI: 101.3 -106.5		
	4		108	104.5 CI: 102.9-106.2	39	108	101.7 CI: 100-103.4		
	5		68	105.8 CI: 103.8-107.8	Other	68	104.3 CI: 101.8-103.4		
	6		84	105.5 CI: 103.8-107.1	39	84	104.7 CI: 102.8-106.7		
<b>DBP</b>									
Vandongen, 1995 <sup>54</sup>	1	Girls	67	61.1 CI: 60.9-63.5	Other	67	57.9 CI: 57.3-58.4		A significant decrease in blood pressure relative to controls was seen only for diastolic blood pressure in girls in the two fitness programs (fitness and fitness + school nutrition)
	4		108	60.4 CI: 59.2-61.5	39	108	57.4 CI: 56.3-58.5		
	5		68	61.7 CI: 60.2-63.1	Other	68	60 CI: 58.2-61.5		
	6		84	62.1 CI: 61.0-63.3	39	84	59.2 CI: 57.8-60.5		
	1	Boys	78	63.6	Other	78	58.1		There was no significant

Author, year	Arm	Subgroup	Baseline N	Baseline measure, mean SD)	Final measure timepoint	N at final measure	Final followup measure, mean SD)	Mean Change from baseline SD)	Measure of association
				CI: 62.2-65			CI: 56.7-59.5		difference between groups
	4		91	61.1 CI: 59.9-62.3	39	91	57.2 CI: 55.9- 58.3		
	5		58	61.8 CI: 60.4-63.1	Other	58	56.7 CI: 55.2-58.1		
	6		97	62.2 CI: 61.1-63.3	39	97	58.3 CI: 57.2-59.5		
<b>Total cholesterol</b>									
Vandongen, 1995 <sup>54</sup>	1	Boys	78	4.37 CI: 4.22-4.51	Other	78	4.41 CI: 4.26 -4.56		Increases were significantly greater than controls for boys in the fitness group.
	4		91	4.22 CI: 4.09-4.35	39	91	4.44 CI: 4.29-4.59		
	5		58	4.05 CI: 3.92-4.19	Other	58	4.29 CI: 4.09-4.49		
	6		97	4.19 CI: 4.06-4.31	39	97	4.41 CI: 4.26-4.56		
	1	Girls	67	4.45 CI: 4.27-4.63	Other	67	4.40 CI: 4.18-4.61		Increases were significantly greater than controls for girls in all intervention groups.
	4		108	4.29 CI: 4.14-4.43	39	108	4.42 CI: 4.28-4.57		
	5		68	4.15 CI: 4 -4.29	Other	68	4.40 CI: 4.25-4.54		
	6		84	4.33 CI: 4.18-4.49	39	84	4.57 CI: 4.40-4.74		

CI = Confidence Interval; DBP = Diastolic blood pressure; N = Sample Size; SBP = Systolic blood pressure; SD = Standard Deviation

Evidence Table 4d. Intermediate outcomes for diet intervention studies taking place in a school only setting

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Change in carbonated drink consumption</b>								
James, 2004 <sup>21</sup>	1	14	1.6 (0.6)	52 weeks	NR	1.8 (0.6)	0.2 (95% CI: -0.2 to 0.5)	0.7 95% CI: 0.1 to 1.3  P=0.4
	2							
<b>Change in energy intake (% sugar)</b>								
Vandongen, 1995 <sup>54*</sup>  Male	All groups	423*	22.8 (95% CI: 22.1, 23.5)	Reported as “About 9 months” (but baseline – between Feb-April; follow up – between Oct- Dec)	423*	21.9 (95%CI: 21.2, 22.7)	-0.3	Among males, there was a decrease in sugar intake significantly different from control in both fitness groups (intervention 1 and 2) and in the school and home nutrition group (intervention 4). No p-values given.
	1	63	21.7 (95% CI: 20.0, 23.3)		63	23.3 (95%CI: 21.4, 25.3)	1.6	
	2	75	23.6 (95% CI: 21.8, 25.3)		75	21.1 (95%CI: 19.4, 22.8)	-2.5	
	3	72	23.3 (95% CI: 21.3, 25.3)		72	20.9 (95%CI: 18.9, 22.8)	-2.4	
	4	73	21.7 (95%CI: 20.1, 23.2)		73	22.5 (95%CI: 20.8, 24.2)	0.8	
	5	54	24.3 (95%CI: 22.5, 26.1)		54	21.5 (95%CI: 19.7, 23.3)	-2.8	From regression models showing interaction terms, significantly greater decrease in sugar intake in males vs. females – 4.2 (95% CI: 2.1, 6.1)
	6	86	22.6 (95%CI: 21.0, 24.1)		86	22.4 (95%CI: 20.7, 24.1)	-0.2	From regression models showing interaction terms, significantly greater decrease in sugar intake in males vs. females – 4.1 (95% CI: 2.2, 5.9)
Vandongen, 1995 <sup>54</sup>  Female	All groups	*446	23.8 (95%CI: 23.1, 24.5)	Reported as “About 9 months” (but baseline –	*446	21.9 (95%CI: 21.2, 22.6)	-1.9	Among females, there was no significant decrease in sugar intake from control; all groups except for the two home nutrition groups (intervention 4 and 5)



Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
				between Feb-April; follow up – between Oct- Dec)				decreased in sugar intake. In the 2 home nutrition groups, sugar intake tended to increase. No p-values given.
	1	63	22.6 (95%CI: 21.0, 24.4)		63	21.1 (95%CI: 19.5, 22.6)	-1.5	
	2	75	23.1 (95%CI: 21.6, 23.6)		75	20.4 (95%CI: 18.8, 22.0)	-3.06	
	3	77	24.3 (95%CI: 22.3, 26.2)		77	20.9 (95% CI: 18.9, 22.8)	-3.4	
	4	91	23.7 (95%CI: 21.9, 25.5)		91	21.5 (95% CI: 29.9, 23.1) typo, but what it says in the table (table 2)	-2.2	
	5	65	25.2 (95%CI: 23.4, 27.1)		65	23.2 (95%CI: 19.7, 23.1)	-2	
	6	75	23.9 (95%CI: 22.2, 25.7)		75	23.9 (95%CI: 21.6, 25.9)	0	
<b>Change in energy intake (% total fat)</b>								
Vandongen, 1995 <sup>54</sup>  Male	All groups	423	33.2 (95%CI: 32.7, 33.7)	Reported as “About 9 months” (but baseline – between Feb-April; follow up – between Oct- Dec)	423	33.7 (95%CI: 33.1, 34.3)	0.5	Among males, following the intervention, the %fat, controlling for baseline, increased in each group relative to controls but changes were not significantly different from controls.  ANOVA showed significant differences (P<0.05) between treatment groups at baseline for total fat (% energy)
	1	63	33.2 (95%CI: 32.7, 33.7)		63	33.2 (95%CI: 31.5, 34.9)	0	
	2	75	32.5 (95%CI: 31.3, 33.7)		75	33.6 (95%CI: 32.3, 35.0)	1.1	
	3	72	33.8 (95%CI: 32.4, 35.2)		72	34.3 (95%CI: 32.8, 35.8)	0.5	
	4	73	34.8		73	33.6	-1.2	

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
			(95%CI: 33.6, 35.9)			(95%CI: 32.3, 34.9)		
	5	54	31.7 (95%CI: 30.4, 32.9)		54	34.2 (95%CI: 32.3, 36.1)	2.5	
	6	86	33.4 (95%CI: 32.2, 34.5)		86	33.4 (95%CI: 31.9, 34.9)	0	
Vandongen, 1995 <sup>54</sup> Female	All groups	446	33.1 (95%CI: 32.6, 33.6)	Reported as “About 9 months” (but baseline – between Feb-April; follow up – between Oct- Dec)	446	34.0 (95%CI: 33.5, 34.6)	0.9	Among females, total fat intake adjusted for baseline decreased relative to controls in all except the school nutrition group. However, the fall was significant from controls in only the home nutrition group.
	1	63	33.8 (95%CI: 32.5, 35.1)		63	35.0 (95%CI: 33.5, 34.6)	1.2	
	2	75	33.5 (95%CI: 32.7, 34.7)		75	34.6 (95%CI: 33.4, 35.8)	1.1	
	3	77	33.2 (95%CI: 32.0, 34.3)		77	34.2 (95%CI: 32.8, 35.6)	1	
	4	91	33.6 (95%CI: 32.3, 34.9)		91	34.8 (95%CI: 33.3, 36.3)	1.2	
	5	65	31.4 (95%CI: 30.0, 32.7)		65	33.7 (95%CI: 32.4, 35.0)	2.3	From regression models showing interaction terms, significantly greater decrease in total fat in females vs. males – 2.9 (95% CI: 1.5, 4.3)
	6	75	33.0 (95%CI: 31.6, 34.3)		75	31.8 (95%CI: 30.2, 33.4)	-1.2	From regression models showing interaction terms, significantly greater decrease in total fat in females vs. males – 3.6 (95% CI: 2.1, 5.1)
<b>Change in energy intake (% saturated fat)</b>								
Vandongen, 1995 <sup>54</sup> Male	All groups	423	13.6 (95%CI: 13.4, 13.9)	Reported as “About 9 months” (but baseline – between Feb-April; follow up – between Oct- Dec)	423	14.1 (95%CI: 13.9, 14.5)	0.5	Among boys, no significant difference from controls but tended to increase intake of saturated fats in all except the school nutrition group.
	1	63	13.6 (95%CI: 12.9, 14.2)		63	14.2 (95%CI: 13.3, 15.0)	0.6	

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
	2	75	13.7 (95%CI: 13.2, 14.3)		75	14.2 (95%CI: 13.6, 14.9)	0.7	
	3	72	13.8 (95%CI: 13.1, 14.6)		72	14.4 (95%CI: 13.7, 15.2)	0.6	
	4	73	14.0 (95%CI: 13.4, 14.6)		73	13.9 (95%CI: 13.3, 14.5)	-0.1	
	5	54	12.9 (95%CI: 12.3, 13.6)		54	14.2 (95%CI: 13.4, 15.0)	1.3	
	6	86	13.6 (95%CI: 13.0, 14.2)		86	14.1 (95%CI: 13.4, 14.8)	0.5	
Vandongen, 1995 <sup>54</sup>  Female	All groups	446	13.9 (95%CI: 13.6, 14.2)	Reported as “About 9 months” (but baseline – between Feb-April; follow up – between Oct- Dec)	446	14.2 (95%CI: 13.9, 14.5)	0.3	
	1	63	14.4 (95%CI: 13.6, 15.1)		63	15.0 (95%CI: 14.3, 15.7)	0.6	
	2	75	14.3 (95%CI: 13.6, 14.2)		75	14.7 (95%CI: 13.9, 15.4)	0.4	
	3	77	14.1 (95%CI: 13.4, 14.7)		77	14.0 (95%CI: 13.3, 14.6)	-0.1	From regression models showing interaction terms, significantly greater decrease in saturated fat intake in females vs. males– 1.5 (95% CI: 0.8, 2.2)
	4	91	14.0 (95%CI: 13.3, 14.6)		91	14.6 (95%CI: 13.9, 15.3)		
	5	65	13.1 (95%CI: 12.3, 13.8)		65	13.6 (95%CI: 12.9, 14.3)	0.5	From regression models showing interaction terms, significantly greater decrease in saturated fat intake in females vs. males – 1.6 (95% CI: 0.8, 2.4). Among females, saturated fat intakes decreased in all treatment groups significantly from controls in the school+home nutrition group.
	6	75	13.8 (95%CI: 13.1, 14.5)		75	13.3 (95%CI: 12.5, 14.1)	-0.5	From regression models showing interaction terms, significantly greater decrease in saturated fat intake in females vs. males – 1.6 (95% CI: 0.9, 2.3). Among females, saturated fat intakes decreased in all

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
								treatment groups significantly from controls in the home nutrition group.
<b>Change in energy intake (MJ/d)</b>								
Vandongen, 1995 <sup>54</sup>  Male	All groups	423	7.4 (95%CI: 7.2, 7.6)	Reported as “About 9 months” (but baseline – between Feb-April; follow up – between Oct- Dec)	423	7.7 (95%CI: 7.5, 7.9)	0.3	Did not change significantly during the intervention for all groups.
	1	63	7.2 (95%CI: 6.8, 7.7)		63	8.0 (95%CI: 7.5, 8.6)	0.8	
	2	75	7.8 (95%CI: 7.4, 8.3)		75	7.6 (95%CI: 7.1, 8.1)	-0.2	
	3	72	7.1 (95%CI: 6.7, 7.5)		72	7.5 (95%CI: 6.9, 8.1)	0.4	
	4	73	7.4 (95%CI: 6.9, 7.8)		73	7.5 (95%CI: 7.0, 8.0)	0.1	
	5	54	7.4 (95%CI: 6.9, 8.0)		54	7.9 (95%CI: 7.2, 8.6)	0.5	
	6	86	7.6, (95%CI: 7.1, 8.1)		86	8.0 (95%CI: 7.5, 8.6)	0.4	
Vandongen, 1995 <sup>54</sup>  Male	All groups	446	6.7 (95%CI: 6.5, 6.8)	Reported as “About 9 months” (but baseline – between Feb-April; follow up – between Oct- Dec)	446	6.8 (95%CI: 6.6, 7.0)	0.1	Did not change significantly during the intervention for all groups.
	1	63	6.8 (95%CI: 6.4, 7.2)		63	6.5 (95%CI: 6.1, 6.9)	-0.3	
	2	75	6.8 (95%CI: 6.4, 7.3)		75	6.9 (95%CI: 6.4, 7.3)	0.1	
	3	77	6.8 (95%CI: 6.3, 7.3)		77	7.0 (95%CI: 6.6, 7.5)	0.2	
	4	91	6.4 (95%CI: 6.0, 6.7)		91	6.9 (95%CI: 6.5, 7.3)	0.5	
	5	65	6.4 (95%CI: 5.9, 6.8)		65	6.6 (95%CI: 6.2, 7.1)	0.2	
	6	75	6.9 (95%CI: 6.4, 7.3)		75	6.8 (95%CI: 6.2, 7.5)	-0.1	

ANOVA = Analysis of Variance; CI = Confidence Interval; PA = Physical Activity; P = p-value; SD = Standard Deviation

**EvidenceTable 5a. Weight related outcomes for physical activity intervention studies taking place in a school only setting**

Author, Year	Arm	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)	Measure of Association
<b>BMI (Kg/m2)</b>																
Walther, 2009 <sup>58</sup>	1	73	-0.01(1)	52	73										-0.24 (1.04)	After adjustment for intraclass correlation, no significant effect on BMI-SDS was detected.
	2	109	0.07(1)	52	109										-0.1 (1.05)	Difference Intervention Group - Control Group; - 0.08 (-0.28 to 0.13) p-value= 0.472
Donnelly, 2009 <sup>11</sup>	1	713	18.0(3.7)									fall 2003-spring 2006	698	20.0 (1.9) CI 2.0-4.6	2.0 (1.9)	There were no significant differences for change in BMI or BMI percentile (baseline to year three) for PAAC vs. control.
	2	814	17.9(3.1)									fall 2003-spring 2006	792	19.9 (1.9) CI: 2.0-4.1	2.0 (1.9)	P value 0.83
Stenevi-Lundgren , 2009 <sup>47</sup>	1	50	16.3(1.9)	52	50										0.4 (CI 0.2, 0.5)	NR
	2	53	16.8(2.9)	52	53										0.5 (CI 0.2, 0.8)	NR
Reed, 2008 <sup>38</sup>	1	90	19.1(3.7)	39	NR	19.4 Range 19.1-19.5									0.3	The unadjusted % difference in change (Intervention % change - control % change) = - 1.0%.) Not significant difference between groups.
	2	178	18.8(3.5)	39	NR	19.2									0.4	NR

Author, Year	Arm	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)	Measure of Association
						Range 19.2-19.6										
Heelan, 2009 <sup>19</sup>	1	123	17.80 (2.97)					104	85						1.24 (1.44)	NR
	2	201	18.95 (3.40)					104	78						1.05 (1.52)	NR
Resaland , 2011 <sup>62</sup>	1	131	17(2.7)					104	82	18.0 (3.0)					0.8	NR
	2	125	Median (SD) = 17.3, (2.7)						92	18.1 (3.0)					0.8	
<b>BMI z-score</b>																
Heelan, 2009 <sup>19</sup>	1	123	NR					104	85		0.03 (0.45)					NR
	2	201	NR					104	78		-0.17 (1.25)					NR
<b>BMI percentile</b>																
Heelan, 2009 <sup>19</sup>	1	123	61.6 (29.1)					104	85						0.58 (13.23)	NR
	P	201	67.6 (22.3)					104	78						-2.08 (14.5)	NR
<b>Percent Overweight/Obese</b>																
Walther, 2009 <sup>58</sup>	1	73	10.9	52	73	14									3.1	NR

Author, Year	Arm	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)	Measure of Association
	2	109	12.8	52	109	7.5									-5.3	NR
Percent body fat																
Heelan, 2009 <sup>19</sup>	1	123	17.80 (2.97)					104	85						1.24 (1.44)	
	2	201	18.95 (3.40)					104	78						1.05 (1.52)	
Stenevi-Lundgren , 2009 <sup>47</sup>	1	50	19(7.4)	52	50		1.3 (CI 0.9, 1.7)								1.3 (CI 0.9, 1.7)	
	2	53	19.3(9.5)	52	53		3.4 (CI 2.7, 4.1)								3.4 (CI 2.7, 4.1)	
Valdimarsson, 2006 <sup>53</sup>	1	50	5.2(3.3)	52	50										1.0 (0.9)	Mean change in fat mass P<0.001 (unadjusted)
	2	53	5.3(3.9)	52	53										1.9 (1.5)	
Change in waist circumference cm																
Resaland , 2011 <sup>62</sup>	1	131	61.2 (6.6)					104	82	64.9 (7.9)					3.7	NR
Resaland , 2011 <sup>62</sup>	2	125	Median (SD) = 61.6, (6.5)						92	65.2 (7.6)					3.3	
Weight change (Kg)																
Stenevi-Lundgren , 2009 <sup>47</sup>	1	50	27.4(5.5)	52	50		3.2 (CI 2.9, 3.6)								3.2 (CI 2.9, 3.6)	NR
	2	53	27.6(5.5)	52	53		3.5 (CI								3.5 (CI 2.9,	P value =0.42.

Author, Year	Arm	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)	Measure of Association
							2.9, 4.2)								4.2)	(unadjusted)
Resaland , 2011 <sup>62</sup>	1	131	32.0 (6.3)					104	82	38.1 (8.0)					6.1	NR
Resaland , 2011 <sup>62</sup>	2	125	Median (SD) =32.9, (6.6)						92	39.1 (8.2)					6.2	

BMI = Body Mass Index; CI = Confidence Interval; Cm = Centimeter; Kg = Kilogram; NR = Not reported; P = P value; PAAC = Physical Activity across the Curriculum; SD = Standard Deviation; SDS = Standard Deviation Score



Evidence Table 5b. Weight related outcomes for physical activity intervention studies taking place in a school only setting, by subgroup

Author, Year	Arm	Subgroup	Base- line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)
<b>BMI</b>																
Sallis, 1993 <sup>42</sup>	1	Boys	101	17.7	Fall '90- spring '91		17.8	Fall '90-fall '91		18.1		Fall '90- spring '92		18.75	0.95	All boys increased their BMI over the two years of the study. At the spring 1991 measurement, the arm1 boys had significantly lower adjusted BMIs than those in arm 2. At the fall 1991 measurement, the arm 1 boys were lower than both arm 2 and arm 3. By spring 1992 the arm1 children increased their BMI to the extent that there were no group differences.
	2		113	17.7	Fall '90- spring '91		18.25	Fall '90-fall '91		18.5		Fall '90- spring '92		19.05	0.8	
	3		91	17.7	Fall '90- spring '91		18.2	Fall '90-fall '91		18.55		Fall '90- spring '92		18.8	0.6	
	1	girls	97	17.55	Fall '90- spring '91		17.8	Fall '90-fall '91		18		Fall '90- spring '92		18.4	0.6	For girls, arm 1 had the lowest adjusted BMI at each measurement point. The only significant difference, however, was at the spring 1992 measurement, at which time the arm1 girls had lower BMIs than girls in both of arm 2 and arm 3
	2		87	17.55	Fall '90- spring '91		18.05	Fall '90-fall '91		18.5		Fall '90- spring '92		18.95	0.9	
	3		60	17.55	Fall '90- spring '91		18.1	Fall '90-fall '91		18.3		Fall '90- spring '92		19.05	0.95	
Lazaar, 2007 <sup>26</sup>	1	boys	NR	15.4 (1.1)	26	NR	15.6 (1.1)								0.2	NS

Author, Year	Arm	Subgroup	Base- line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)
	2		NR	20 (1.3)	26	NR	20.3 (1.9)								0.3	
	3		NR	15.5 (1.2)	26	NR	15.4 (1.2)								-0.1	
	4		NR	21 (2.4)	26	NR	20.9 (2.6)								-0.1	
	1	girls	NR	15.6 (1.1)	26	NR	15.9 (1.1)								0.3	NS
	2		NR	20.4 (2.2)	26	NR	20.8 (2.1)								0.4	
	3		NR	15.9 1.2	26	NR	15.8 (1.2)								-0.1	
	4		NR	20.1 2.8	26	NR	19.9 (3.2)								-0.2	
Smolak, 2001 <sup>45</sup>	1	Girls	NR	NR				104	NR	19.35 (3.90)						This study has two control groups and one experimental group.
	1		NR	NR				104	NR	19.15 ( 2.78)						
	2		NR	NR				104	NR	18.97 ( 3.22)						There were no group differences in BMI
	1	Boys	NR	NR				104	NR	19.70 (3.38)						This study has two control groups and one experimental group
	1		NR	NR				104	NR	20.83 (4.10)						
	2		NR	NR				104	NR	19.85 ( 3.50)						There were no group differences in BMI
Chiodera, 2008 <sup>7</sup>	2	Girls	370	16.17 ( 2.2)	32	370	16.16								-0.01	NS
	3		469	16.77 (2.5)	32	469	16.73 (2.5)								-0.04	NS
	4		416	17.31 (2.7)	32	416	17.26 (2.7)								-0.05	NS
	5		413	17.96 ( 3.3)	32	413	17.95 (3.3)								-0.01	NS
	6		373	18.53 (3.1)	32	373	18.5 (3.1)								-0.03	NS
	2	Male	444	16.46 (2.3)	32	444	16.25 ( 2.3)								-0.021	P<0.01

Author, Year	Arm	Subgroup	Base- line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)
	3		453	16.95 (2.6)	32	453	16.9 (2.6)								-0.05	NS
	4		430	17.16 (2.4)	32	430	17.11 (2.6)								-0.05	NS
	5		435	17.9 (2.9)	32	435	18.00 (3.0)								-0.01	P<0.01
	6		374	18.75 (3.1)	32	374	18.83 (3.1)								0.08	NS
Resaland, 2011 <sup>62</sup>	1	Girls	69	17.5 (3.0)				104	43	18.2 (3.2)					0.7	
	2	Girls	62	Median (SD) =17.6, (3.1)					49	18					0.4	
	1	Boys	62	16.9 (3.1)				107	43	17.9 (2.8)					1	No significant effect of intervention on BMI.
	2	Boys	63	Median (SD) =17.0, (2.2)				104	49	17 (2.5)					0.8	
Salmon, 2008 <sup>43</sup>	1	Girls	Esti mate d to =31	2.8 (4.1)						-0.08						There were significant intervention effects on unadjusted BMI among girls in the FMS and BM/FMS groups compared with the control group.
	2		Esti mate d to =34	3.1 (3.3)												GEE coefficient at baseline and post intervention Unadjusted change; -0.07 (-1.12 to 0.02) P<0.01
	3		Esti mate d to = 39	3.0 (3.7)												GEE coefficient at baseline and post intervention Unadjusted change; -0.03 (-0.08 to 0.02)

Author, Year	Arm	Subgroup	Base- line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)
	4		Esti mate d to =48	1.8 (3.1)												GEE coefficient at baseline and post intervention Unadjusted change; -0.07 (-0.13 to -0.01) P<0.05
	1	Boys	Esti mate d to =31	4.5 (3.3)												
	2		Esti mate d to =34	3.3 (3.8)												GEE coefficient at baseline and post intervention Unadjusted change; -0.01 (-0.07 to 0.04) P<0.01
	3		Esti mate d to = 39	3.3 (3.2)												GEE coefficient at baseline and post intervention Unadjusted change; -0.07 (-1.12 to 0.02)
	4		Esti mate d to =48	2.8 (4.0)												GEE coefficient at baseline and post intervention Unadjusted change; -0.07 (-0.13 to -0.01) P<0.05
Thivel, 2011 <sup>50</sup>	1	Normal Weight	187	15.48 (1.11)	26	187	15.71 (1.1)								0.23	NS
	2		169	15.62 (1.1)	26	169	15.55 (1.1)								-0.07	
	1	Obese	41	20.19 (1.8)	26	41	20.41 (1.9)								0.12	NS
	2		60	20.56 (2.6)	26	60	20.38 (2.9)								-0.18	
Chiodera, 2008 <sup>7</sup>	2	Grade 1	814	16.33 (2.3)	34	814	16.21 (2.3)								-0.12	P value <0.01

Author, Year	Arm	Subgroup	Base- line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)
	3	2	922	16.86 (2.5)	34	922	16.81 (2.6)								-0.5	NS
	4	3	846	17.24 (2.6)	34	846	17.18 (2.6)								-0.06	NS
	5	4	848	17.93 (3.1)	34	848	17.97 (3.1)								0.04	NS
	6	5	747	18.64 (3.1)	34	747	18.66 (3.1)								0.02	NS
<b>BMI z-score</b>																
Lazaar, 2007 <sup>26</sup> % or change in prevalence	1	boys	NR	0.67 (0.60)	26	NR	0.69 (0.61)								0.02	
	2		NR	3.02 (0.62)	26	NR	3.08 (0.90)								0.06	
	3		NR	0.76 (0.51)	26	NR	0.75 (0.51)								-0.01	
	4		NR	3.15 (1.13)	26	NR	3.07 (1.13)								-0.08	
	1	girls	NR	0.69 (0.46)	26	NR	0.68 (0.46)								-0.01	
	2		NR	2.98 (1.08)	26	NR	3.05 (1.11)								0.07	
	3		NR	0.77 (0.51)	26	NR	0.75 (0.50)								-0.02	
	4		NR	2.94 (1.18)	26	NR	2.75 (1.10)								-0.19	
Lazaar, 2007 <sup>26</sup>	1	boys	NR	22.6 ( 5.6)	26	NR	24.5 (6.5)								1.9	
	2		NR	53.1 (10.6)	26	NR	55.9 (10)								2.7	
	3		NR	23.8 (5.9)	26	NR	22.7 (6.3)								-1.1	
	4		NR	53.5 (11.2)	26	NR	51.7 (10.4)								-1.8	
	1	girls	NR	29.5 (7.6)	26	NR	30.1 ( 7)								0.6	
	2		NR	30.1 (7)	26	NR	54.9 (11.4)								24.8	

Author, Year	Arm	Subgroup	Base- line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)
	3		NR	29.8 (7.4)	26	NR	28 (8.9)								-1.9	
	4		NR	55.8 (11.9)	26	NR	51.9 (10.7)								-3.9	
<b>Percentage overweight or obesity</b>																
<b>Waist circum-ference (cm)</b>																
Lazaar, 2007 <sup>26</sup>	1	boys	NR	55.6 (3.6)	26	NR	55.9 (3.8)								0.3	WC was not significantly affected over time, although a slight decrease was noted in GI (arm3 and 4) and a slight increase in GC (arm1 and 2
	2		NR	67.2 (5.2)	26	NR	67.8 (6)								0.6	
	3		NR	55.8 (3.8)	26	NR	55.7 (3.7)								-0.1	
	4		NR	70.1 (8.4)	26	NR	69.7 (8.7)								-0.4	
	1	girls	NR	56.4 (3.7)	26	NR	57.7 (4.0)								1.3	P<0.001 effect of groups
	2		NR	68.3 (6.6)	26	NR	70.5 (6.2)								2.2	
	3		NR	57.5 (3.8)	26	NR	55.6 (4.2)								-1.9	
	4		NR	67.0 (7.6)	26	NR	64.9 (8.1)								-2.1	
<b>Weight Kg</b>																
Thivel, 2011 <sup>50</sup>	1	Obese	41	33.60 (5.1)	26	41	34.13 (5.3)								0.53	NS
Vizcaino, 2008 <sup>56, 67</sup>	2		60	33.89 (7.3)	26	60	34.4 (7.9)								0.51	
	1	Normal Weight	187	23.77 (3.3)	26	187	24.54 (3.4)								0.77	NS
	2		169	24.10 (3.6)	26	169	24.85 (3.6)								0.75	

Author, Year	Arm	Subgroup	Base- line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final Follow-up measure, mean (SD)	Mean Change from Baseline (SD)
	1	Girls	289	36.0 (9.5)	52	289	37.9 (9.8)	104	289	43.1 (11.0)					7.1	Adjusted difference 0.23 (-0.13-0.60) p value= 0.20 after year 1, 0.28 (- 0.31-0.87) p value 0.34 after year 2.
Resaland, 2011 <sup>62</sup>	2		185	36.2 (8.4)	52	185	38.5 (8.6)	104	185	43.6 (9.3)					7.4	
	1	Boys	257	37.2 (9.0)	52	257	38.9 (9.3)	104	257	43.3 (10.4)					6.1	Adjusted difference 0.49 (0.17-0.82) p value 0.03 after year 1, 0.95 (0.19- 1.71) p value 0.01 after year 2.
	2		190	36.2 (8.9)	52	190	38.5 (9.4)	104	190	43.3 (10.7)					7.1	
	1	Boys	62	31.7 (5.5)				104	43	37.6 (7.3)					6.5	NS
Resaland, 2011 <sup>62</sup>	2	Boys	63	Median (SD) =32.4, (5.2)				104	49	38.1 (6.5)					5.7	NS
Resaland, 2011 <sup>62</sup>	1	Girls	69	32.4 (6.9)				104	39	38.6 (8.7)					6.2	NS
Resaland, 2011 <sup>62</sup>	2	Girls	62	Median (SD) =33.3, (7.9)				104	43	40.2 (9.7)					6.9	NS

BM = Behavioral Modification; BMI = Body Mass Index; FMS = Fundamental Movement Skills; GC = Control Group; GEE = Generalized Estimating Equation; GI = Intervention Group; NR = Not Reported; P = P value; NS = Not Significant; SD = Standard Deviation; WC = Waist circumference

**Evidence Table 5c. Clinical outcomes for physical activity intervention studies taking place in a school only setting, subgroups**

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
<b>SBP</b>								
Reed, 2008 <sup>38</sup>	1	90	104 (10.5)	Other		108 CI: 106-110		Systolic blood pressure in the INT group decreased significantly compared with an increase in the UP group (P<0.05).
	2	178	105 (9.3)	39 weeks		102 CI: 100-104	-5.7%	
Resaland, 2011 <sup>62</sup>	1	131	108.9 (7.9)	104 weeks	82	109.7 (7.7)	0.8	NR
	2	125	109.0 (7.8)		92	107.3 (6.4)	-1.7	
<b>DBP</b>								
Reed, 2008 <sup>38</sup>	1	90	60 (8.2)	Other		65 CI: 62-68.6		There was no difference for change in diastolic blood pressure.
	2	178	63 (7.5)	39 weeks		63 CI: 60-65	-3.8%	
Resaland, 2011 <sup>62</sup>	1	131	61.9 (6.4)	24 months	82	59.5 (5.8)	-1.4	NR
	2	125	62.7 (6.6)		92	61.1 (6.1)	-1.6	
<b>HDL</b>								
Walther, 2009 <sup>58</sup>	1	57	1.47 (0.42)	52	57	1.47 (0.37)		
	2	105	1.38 (0.31)	52	105	1.42 (0.33)		Difference between intervention and control 0.03 (-0.08 to 0.14), p value =0.623
<b>LDL</b>								
Reed, 2008 <sup>38</sup>	1	23	2.5 (0.5)	Other		2.5 CI: 2.4-2.7	-0.4%	Although all serum variables in the INT group decreased more than these same variables for the UP group—changes failed to reach significance.
	2	37	2.5 (0.6)	39 weeks		2.4 CI: 2.3-2.5		
Walther, 2009 <sup>58</sup>	1	57	2.18 (0.57)	52	57	2.14 (0.65)	-0.04	



Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
	2	105	2.18 (0.54)	52	105	2.17 (0.5)	-0.01	Difference between intervention and control 0.04 (-0.14 to 0.21), p value 0.668
<b>Ratio of total cholesterol to high-density lipoprotein level (TC:HDL)</b>								
Reed, 2008 <sup>38</sup>	1	23	3.3 (0.8)	Other	NR	3.3 CI: 3.1-3.5	-6.0%	Although all serum variables in the INT group decreased more than these same variables for the UP group—changes failed to reach significance.
	2	37	3.2 (0.8)	39 weeks	NR	3.1 CI; 3.0-3.3		
<b>Total cholesterol</b>								
Reed, 2008 <sup>38</sup>	1	23	4.5 (0.6)	Other		4.3 CI; 4.1-4.5	-4.6%	NS
	2	37	4.3 (0.7)	39 weeks	NR	4.1 CI; 4.0-4.2		
Walther, 2009 <sup>58</sup>	1	56	4.26 (0.7)	52	56	4.12 (0.66)	-0.14	
	2	105	4.2 (0.63)	52	105	4.19 (0.6)	-0.1	Difference between intervention and control 0.11 (-0.13 to 0.35), p value 0.370
Resaland, 2011 <sup>62</sup>	1	131	2.77 (0.51)	24 months	82	2.82 (0.61)	0.5	NR
	2	125	2.93 (0.64)		92	2.81 (0.59)	-0.08	
<b>Triglycerides, mmol/L</b>								
Walther, 2009 <sup>58</sup>	1	56	1.10 (0.51)	52	56	1.11 (0.52)	0.01	
	2	105	1.10 (0.46)	52	105	1.04 (0.49)	-0.06	Difference between intervention and control -0.08 (-0.29 to 0.14), p value 0.500
Resaland, 2011 <sup>62</sup>	1	131	0.72 (0.25)	24 months	82	0.80 (0.34)	0.08	NR
	2	125	0.73 (0.25)		92	0.73 (0.28)	0	

CI = Confidence Interval; DBP = Diastolic Blood Pressure; HDL = High Density Lipoprotein; INT = Intervention; LDL = Low density lipoprotein; Mmol/L = Millimoles/Liter; NR = Not reported; NS = Not significant; P = P value; SBP = Systolic Blood Pressure; SD = Standard Deviation; TC = Total Cholesterol; UP = Usual Practice

Evidence Table 5d. Intermediate outcomes for physical activity intervention studies taking place in a school only setting

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Daily physical activity (via accelerometer)</b>								
Donnelly, 2009 <sup>11</sup>	1	90						
	2	77				Children in PAAC schools had greater PA (13%N). Children in PAAC schools had significantly greater levels of PA during the school day (12%N) and on weekends (17%N) and also exhibited greater levels of PA on weekdays (8%N, p=0.05). Children in PAAC schools also exhibited 27% greater levels of moderate to vigorous intensity PA (≥4 METS)		Exhibited greater levels of PA on weekdays (8% N, p=0.05)
<b>Total physical activity</b>								
Stenevi-Lundgren, 2009 <sup>47</sup>	1	50		52 weeks (12 mo)	50	hours/week throughout the study - 2.9 (1.9) h/week		P<0.05 between control and intervention
	2	53		52 weeks (12 mo)	53	hours/week throughout the study - 4.4 (1.3) h/week		
<b>Participation in organized sports (hr)</b>								
Stenevi-Lundgren, 2009 <sup>47</sup>	1	50	1.3 (1.6) h/week	52 weeks (12 mo)	50	1.9 (1.9) h/week		At baseline, P=0.055 between control and intervention.  At follow up, P<0.05 between control and intervention.
	2	53	0.7 (1.2) h/week	52 weeks (12 mo)	53	1.1 (1.3) h/week		
Salmon, 2008 <sup>43*</sup>  Female	2			52				Baseline to follow up Intervention and maintenance effects (coefficient, 95% CI); 11.1 (3.8 to 18.4) P value <0.01
	3			52				Baseline to follow up Intervention and maintenance effects (coefficient, 95% CI); 10.2 (4.7 to 25.1)
	4			52				Baseline to follow up Intervention

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
								and maintenance effects (coefficient, 95% CI); 0.3 (7.7 to 8.3)
Salmon, 2008 <sup>43</sup>	2	66		52	60			b-coefficients (95% CI); 4.3 (3.6 to 12.2)
	3	74		52	69			b-coefficients (95% CI); 9.5 (1.4 to 17.6) P<0.05
	4	93		52	84			b-coefficients (95% CI); 6.7 (6.4 to 19.8)
<b>Moderate to Vigorous physical activity (min/day)</b>								
Howe, 2012 <sup>20</sup>	1	27	0.91 (0.14)	43	28	1.49 (0.12)	0.58	P<0.04
	2	22	0.83 (0.13)	43	23	0.98 (0.13)	0.15	NS
	3	36	0.83 (0.10)	43	36	0.91 (0.12)	0.08	NS
<b>Vigorous physical activity</b>								
Salmon, 2008 <sup>43</sup>	2	66		52	60			b-coefficients (95% CI); 2.8 (0.2 to 5.4) P value<0.05
	3	74		52	69			b-coefficients (95% CI); 7.7 (3.2 to 12.2) p value <0.01
	4	93		52	84			b-coefficients (95% CI); 3.0 (0.59 to 6.6)
Salmon, 2008 <sup>43</sup> Male	2			52				Baseline to follow up Intervention and maintenance effects (coefficient, 95% CI); 4.4 (0.44 to 8.4) P value <0.05
	3			52				Baseline to follow up Intervention and maintenance effects (coefficient, 95% CI); 13.8 (8.4 to 19.1) P value <0.001
	4			52				Baseline to follow up Intervention and maintenance effects (coefficient, 95% CI); 4.8 (1.2 to 10.7)
<b>TV viewing (min/d)</b>								
Salmon, 2008 <sup>43</sup>	2	66		52	60		-6	b-coefficients (95% CI); 239.9 (27.6 to 452.2) p value<0.05

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
	3	74		52	69		-5	b-coefficients (95% CI); 142.6 (33.6 to 318.9)
	4	93		52	84		-9	b-coefficients (95% CI); 141.9 (15.6 to 299.5)

%N = Percent Sample Size; B-Coefficient = Beta Coefficients; CI = Confidence Interval; Hr = Hour; METS = metabolic equivalent; Min/day = Minutes/Day; Mo = month; N = Sample Size; NS = Not Significant; P = P-value; PA = Physical Activity; PAAC = Physical Activity Across the Curriculum; SD = Standard Deviation

**Evidence Table 6a. Weight related outcomes for combined diet and physical activity intervention studies taking place in a school only setting**

Author, Year	Arm	Base- line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
<b>BMI (Kg/m<sup>2</sup>)</b>																
Gutin, 2008 <sup>17, 63</sup>	1	164	18.4	52	164	19.75		104	164	21.1		138	164	21.75	3.35	
	2	42	18.8	42	42	20		104	42	20.8		138	42	22.1	3.3	
Barbeau, 2007 <sup>2</sup>	1	83	20.9 (5.6)	43	83	22.2 (6.1)									1.3	
	2	118	20.9 (5.0)	43	118	21.6 (5.2)									0.7	Adjusted mean change= - 0.45 (95% CI; -0.79 to -0.12) P= 0.008
Manios, 2006 <sup>34, 61</sup>	1	222	16.3 (0.15)	312		20.3 (SE=0.17) CI: 0.26 to 4.03						520 weeks		23.0 (SE=0.21) CI; 0.29 to 6.67	6.7	P=0.043 Adjusted Mean change =6.67 (SE 0.21)
	2	261	16.2 (0.13)	312		20.3 (SE=0.16) CI; 0.26 to 3.53						520 weeks		22.2 (SE=0.18) CI; 0.25 to 6.05	4	Adjusted Mean change =6.05 (SE 0.18)
Manios, 1999 <sup>32</sup>	1	177	16.3 (0.2)					156	177	18.1 (SE:0.1) CI;0.2 to 1.8					1.8	Adjusted Mean change= 1.8 (0.1)
	2	248	16.2 (0.1)					156	248	17.0 (SE=0.1) CI;0.2 to 0.7					0.8	Adjusted Mean change= 0.7 (0.1) P-value 0.001
Manios, 2002 <sup>33</sup>	1	285	16.3 (2.2)	312	285	20.5 (4.1)									4.2	Adjusted Mean change =3.68 (0.16)
	2	356	16.3 (2.3)	312	356	19.9 (3.9)									3.6	Adjusted Mean change = 4.28 (0.16) P value<0.05
Sollerhed, 2008 <sup>46</sup>	1	74										156	74	0.25 (1.576)	0.25 (1.576)	P=0.033
	2	58										156	58	-0.32 (1.442)	-0.32 (1.442)	
Graf, 2008 <sup>16</sup>	1	172	16.4(2.4)									208 weeks	170	17.9(3.4)	1.5 (1.8)	Difference from ANCOVA:

Author, Year	Arm	Base- line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
																0.7 (95%CI: 0.3-1.1) p<0.001
	2	414	16.2(2.2)									208 weeks	410	18.3 (3.4)	2.1 (2.1)	
Neumark-Sztainer, 2010 <sup>36</sup>	1	174	25.5 (6.49)	39	159	26.1									0.6	Intervention effect: -0.10 p =0.446
	2	182	25.9 (7.11)	39	177	26.0									0.1	
Madsen, 1993 <sup>68</sup>		162	19.2(3.9)	52	84	r= -0.03						104	82		r= -0.03	r=0.09
		162	19.2(3.9)	52	84	r=0.04						104	82		r=0.04	R=0.07
		162	19.2(3.9)	52	84	r= -0.03						104	82		r= -0.03	r=0.09
Magnusson, 2012 <sup>31</sup>	1	76	16.7(2.1)					104		17.5 (2.7)					0.8	NS
	2	90	Median (SD) =16.0, (1.8)							17.4 (2.2)		104			1.4	
Lubans, 2012 <sup>28</sup>	1	179	22.59 4.49)	52	153	23.37 (4.68)									0.8	P<0.001
	2	178	Median (SD) =22.70, (4.70)		141	23.30 (4.71)									0.6	
Llargues, 2012 <sup>27</sup>	1		237	16.4(2.8)	104	NR	18.12 (3.4)					208	201	19.1(3.8)	2.7	
	2		272	Median (SD) =16.94, (2.38)			17.7 (2.9)					208	225	18.9(3.5)	2.04	
Burguera, 2011 <sup>5</sup>	2 High PA	27	22.4(4.5)	26		22.6(4.9)									-0.6 (95% CI -1.4; 0.2)	NR
	3 Low PA	29	22.5(4.3)	26		22.1(4.3)									-0.4 (95% CI- 0.9; 0.1)	
Howe, 2011 <sup>20</sup>	1	44	20.0(4.4)	40	44	20.5(4.6)									0.5	NR
	2	31 (ATT)	Median (SD) =20.4,	40	31	20.3(5.5)									-0.1	

Author, Year	Arm	Base- line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
			(5.4)													
	3	31 (NTT)	20.3(4.9)	40	31	20.7(5.2)									0.4	
Taylor, 2007 <sup>49</sup>	1	219	18.2(3.3)	52	217		18.9 (3.8)					104	136	19.7 (3.8)	0.8	NR
	2	250	17.4(2.4)	52	246		17.9 (2.7)					104	151	18.3 (3.1)	0.4	NR
<b>BMI z-score</b>																
Muckelbauer, 2009 <sup>35</sup>	1	1309	0.30(1.13)	43			0.007 (0.295)									
	2	1641	0.23(1.06)	43			0.005 (0.289)									Estimated group difference in BMI SDS change; -0.004 95%CI -0.045-0.036, p=0.829
Sahota, 2001 <sup>41</sup>	1	312	NR	43									303			Effect of intervention, weighted mean diff and 95%CI of intervention schools and control schools = 0 (-0.1, 0.1)
	2	301	NR	43									292			
Amaro, 2006 <sup>1</sup>	1	88	0.15 (0.88)	24	74											Not significant at follow up Adjusted means were 0.405 (95% CI 0.345 to 0.465)
	2	153	0.47 (0.93)	24	123											Adjusted means were 0.345 (95% CI 0.299 to 0.390)
Newton, 2010 <sup>37</sup>	1															
	2	77	0.8 (0.1)	26	77	0.8(0.1)		52	59	0.9 (0.2)		78	55	0.8 (0.2)	0	NS
Rosario, 2012 <sup>39</sup>	1	233	0.66(1.12)	24	143	0.92(1.0)	0.34 (0.05)									
	2	231	Median (SD) =0.84, (1.07)	24	151	0.90(0.97)	0.13 (0.04)									After intervention, the BMI z- score variation (post intervention—baseline) was higher in the control than in the intervention subjects

Author, Year	Arm	Base-line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
																[respectively, mean (se) 0.34 (0.05) versus 0.13 (0.04)]. After adjusting for gender, age, baseline total energy intake, baseline BMI z-score and parents' education, the BMI z-score increased 0.176 units more in the control group than in the intervention group [95% CI = (0.044;0.308), p = 0.009].
Lubans, 2012 <sup>28</sup>	1	179	0.78(1.16)	52	153	0.81(1.17)									0.03	NR
	2	178	Median (SD) =0.82, (1.12)		141	0.76(1.16)									-0.06	
Taylor, 2007 <sup>49</sup>	1	219	0.80(0.87)	52	217		0.79 (0.86)					104	135	0.89 (0.81)	0.09	
	2	250	0.61(0.82)	52	246		0.53 (0.84)					104	151	0.45 (1.00)	-0.16	Adjusted difference year 1; -0.09 95% CI: -0.18, -0.01  Year 2; -0.26 95% CI: -0.32, -0.21
<b>Percent (%) Overweight/ Obese</b>																
Muckelbauer, 2009 <sup>35</sup>	1	1309	25.90	47		27.80										OR=1.00
	2	1641	23.40	47		23.50										OR= 0.69 95%CI; 0.48-0.98, p=0.04
Llargues, 2012 <sup>27</sup>	1		201	8.0%	NR				104	201	11.2%		208	201	8.5%	
	2		225	Median (SD) =10.3%	NR					225	8.6%			225	6.7%	
Coleman, 2011 <sup>8</sup>	1			22%	52	22%	104	25%							3%	NS
	2			28%	52	27%	104	32%							4%	



Author, Year	Arm	Base- line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
Taylor, 2007 <sup>49</sup>	1	219	42.5	52	217	40.6						104	136	47.8	5.3	
	2	250	32.4	52	246	28.0						104	151	28.5	-3.9	Adjusted difference Year 1; 0.92 (0.71, 1.18), Year 2; 0.88 (0.69, 1.14)
Damon, 2005 <sup>9</sup>	1	231		14				43								
	2	260		14				43								
<b>Obesity prevalence (%)</b>																
Klish, 2012 <sup>25</sup>	1	510	154 (30.2)	36	510	29.8										
	2	779	237 (30.4)	36	510										Mean change=- 0.4;mean =242;SD =31.1	OR = 0.98 (95% CI 0.76 to 1.25); p=0.86
Rosario, 2012 <sup>39</sup>	1	233	5.0%	24	143	9.1%										
	2	231	Median (SD) =4.5%		151	6.6%										Change in obesity -.058 (95% CI 0.04-4.94); p-value = 0.493
Fung, 2012 <sup>14</sup>	1	3421	6.9%					104	3398	8.8%					1.9	Change in obesity 8.8%; OR = 1.37 (95% CI 1.11- 1.70)
	2	293	Median (SD) =12.5%						394	10.7%					-1.8	
<b>Incidence of overweight</b>																
Rosario, 2012 <sup>39</sup>	1	98	mean (SD) = Not applicable since looking at incidence of over-	24	98	18.4%	Un- adjusted percent change = 18.4									

Author, Year	Arm	Base- line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
			weight													
	2	89	Median (SD) =Not applicable since looking at incidence of over- weight			5.6%	Un- adjusted percent change = 5.6									0.25 (95% CI 0.07-0.92); p- value = 0.037
Coleman, 2011 <sup>8</sup>	1		22%	52		27		104		mean=25 %mean=3 0%					5%	NR
Warren, 2003 <sup>59</sup>	1	4	52	2%	42	2%									0.0	
<b>BMI- percentile</b>																
Lubans, 2012 <sup>28</sup>	1	50														NR
	2	50														
<b>Percent body fat</b>																
Gutin, 2008 <sup>17</sup>	1	164	26.1%	52	164	26.7%		104	164	30%		138	164	29%	2.9	p<0.05 for time x group
	2	42	26.5%	52	42	27.2%		104	42	29.9%		138	42	27.5%	1	
Barbeau, 2007 <sup>2</sup>	1	83	30.7 (12.7)	43	83	31 (12.2)									0.3	
	2	118	30.2 (11.9)	43	118	29.1 (11.8)									-1.1	Adjusted change-2.01 (CI - 2.98 to -1.04) P value <0.0001
Skybo, 2002 <sup>44*</sup>	1	25	26 (8)									34	24	27(9)	1	
	2	33	25 (10)									34	32	26(11)	1	
Newton, 2010 <sup>37†</sup>	1															
	2	77	25.0 (1.3)	26	77	25.5 (1.3)		52	59	25.1 (1.5)		78	55	25.3 (1.5)	0.3	NS for trend in main effect over time; however, three way interaction for %BF (p=0.027) with gender. (gender x time x %BF).
Magnusson, 2012 <sup>31</sup>	1		76	24.9(5.2)					104		26.4 (6.6)				1.5	NR
	2		90	Median							24.7 (7.6)				0.9	

Author, Year	Arm	Base- line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
				(SD) =23.8, (6.5)												
Lubans, 2012 <sup>27</sup>	1		179	28.31 (6.76)	52	153	32.55 (5.87)								4.24	NS
	2		178	Median (SD) =29.58, (6.54);		141	32.72 (5.85)								3.14	
<b>Body fat, % lean mass</b>																
Magnusson, 2012 <sup>31</sup>	1		76	mean (SD) = 20.2(2.8) ;					104		24.8 (3.6)				4.6	NR
	2		90	Median (SD) =19.9, (2.2);					104		24.6 (2.8)				4.7	
Bronikowski, 2011 <sup>3</sup>				28.1(2.3)	65(15 months )	34	30.0 (2.4)		130 wks (30 months)	34	31.8 (2.2)				3.7	
				Median (SD) =26.3, (1.9)		38	32.0 (2.0)		130 wks (30 months)	38	33.1 (1.8)				6.3	ANOVA (F test),Differences between groups in terms of changes in muscle mass, F(2, 140) = 3.81; p=0.02
				25.0(1.4)	32	26.4(1.8)		130 wks (30 months)	32	26.8(1.4)					1.8	
				26.0 (1.2)	33	29.0(1.3)		130 wks (30 months)	33	28.1(1.2)					2.1	
<b>Percent body fat meas. with DXA</b>																
Neumark- Sztainer2010 <sup>36</sup>	1	174	36.6 (8.84)	39	159		37.7%								1.1	Intervention effect: 0.46 P=0.216
	2	182	37.3 (9.55)	39	177		37.2%								-0.1	
<b>Triceps skin fold</b>																

Author, Year	Arm	Base- line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
<b>thickness.</b>																
Walter, 1985 <sup>57</sup>	1	446	12.6 (5.7)	52	310	13.7 (5.8)	+1.1									
	2	1117	13.1 (6.1)	52	805	14.4 (6.4)	+1.3									P value 0.302
Bush, 1989 <sup>6</sup>	1	148	14.8 (7.2)					104	148	14.5 (7.1)	-0.32 SE=0.43					
	2	283	15 (7.3)					104	283	15.3 (7.5)	0.33 SE=0.32					Difference in change in skinfold = 0.24; se=0.51; p=0.636
<b>Waist Circum- ference(cm)</b>																
Barbeau, 2007 <sup>2</sup>	1	83	67.0 (12.2)	43	83	69.9 (12.5)									+2.9	
	2	118	66.5 (11.5)	43	118	67.9 (11.3)									-1.34	CI: -2.78 to 0.09 P=0.068
Sollerhed, 2008 <sup>46</sup>	1	74		156	74		0.041 (5.0865)									P=0.917
	2	58		156	58		0.052 (5.0198)									
Magnusson, 2012 <sup>31</sup>	1	76	57.6 (5.0)					104		60.8 (6.2)					+3.2	NR
Magnusson, 2012 <sup>31</sup>	2	90	Median (SD) =57.0, (4.7)							61.1 (6.0)					+4.1	
Howe, 2011 <sup>20</sup>	1	44	65.7(9.9)	40	44	67.1(10.3)									1.4	NR
	2	31	Median (SD) =66.4, (11.6)		31	66.9(12.1)									0.5	NR
	3	31	66.1(10.8)		31	67.5(12.2)									1.4	
Taylor, 2007 <sup>49</sup>	1	219	61.4 (9.6)					52	217	64.2(10.8)		104	136	65.8 (10.3)	2.8	
	2	250	58.9 (7.5)					52	246	62.0 (8.5)		104	151	62.2 (8.1)	3.3	Adjusted difference

Author, Year	Arm	Base-line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
																Year 1; 0.1 95% CI: -1.0, 1.0  Year 2; -1.0 95% CI: -2.0, 0.0 No intervention effect was observed on waist circumference.
<b>Body fat, sum of 4 SF measures</b>																
Magnusson, 2012 <sup>31</sup>	1		76	33.6 (12.4)					104		40.4 (17.6)				+3.8	NR
	2		90	Median (SD) =31.7, (12.2)							38.3 (16.4)				+6.6	
<b>Weight, Kg</b>																
Manios, 1999 <sup>32</sup>	1	177	24.4 (0.3)									156	177	32.8 (0.5)	9.1 (0.3)	
	2	248	22.8 (0.3)									156	248	30.9 (0.4)	7.4 (0.2)	NS
	1	285	24.3 (4.6)	312	285	46.2 (11.5)									22•9 (SE 0.38)	There was significantly higher weight gain in control group compared to intervention group.
	2	356	23.1 (4.5)	312	356	45.2 (11.2)									21.6 (SE 0.37)	P value <0.05
Bronikowski, 2011 <sup>3</sup> Boys	1		49.7 (9.76)											59.9 (9.76)	10.2	P = 0.95
	2		48.7 (8.82)											60.9 (8.33)	12.2	
Bronikowski, 2011 <sup>3</sup> Girls	1		50.2 (7.79)											56.0 (9.21)	5.8	
	2		48.2 (5.79)											56.9 (6.78)	8.7	P = 0.26
Taylor, 2007 <sup>49</sup>	1	219	29.8 (8.7)	52	217	33.9 (11.6)						104	136	37.3 (11.0)	4.1	NR
	2	250	28.1 (8.3)	52	246	31.9 (9.4)						104	151	35.3 (11.1)	3.8	NR

Author, Year	Arm	Base-line N	Bas-line measure, mean (SD)	First follow-up timepoint in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
Weight, z-score																
Taylor, 2007 <sup>49</sup>	1	219	0.65 (0.97)	52	217	0.64 (0.99)						104	135	0.72 (0.92)	0.7	
	2	250	0.44 (0.91)	52	246	0.42 (0.89)						104	151	0.37 (0.96)	-0.2	Adjusted difference year 1; -0.03 95% CI: -0.10, 0.05 year 2; -0.17 95% CI: -0.21, -0.13
<b>Pounds (lbs)</b>																
Skybo, 2002 <sup>44</sup>	1	25	72(18)	22	24	74 (18)						34	24	78 (19)	+6	
	2	33	73(18)	22	32	75 (20)						34	32	78 (21)	+2weight	P<0.05

ANCOVA = Analysis of Covariance Test; BMI = Body Mass Index; CI = Confidence Interval; DXA = Dual-Energy X-Ray Absorptiometry; Kg/m<sup>2</sup> = Kilograms per meter squared; Lbs = Pounds; NR = Not Reported; NS = Not significant; OR = Odds Ratio; P = P-value; r = Pearson’s r; SD = Standard deviation; SE = Standard Error; SF = Skin Fold OR = Odds Ratio; Wks = Weeks

\* MALES: In this study, 52% of the males in the experimental group and 67% of the males in the control group had body fat percentages higher than 20%. In the experimental group, one male converted from abnormal levels to normal levels, whereas none of the males in the control group changed to normal levels. In fact, 22% of the control group males moved into the high-risk category by the end of the study.

FEMALES: Seventy-two percent of the experimental group girls and 47% of the control group girls maintained body fat percentages higher than the 24% recommendation. During the course of the program, 7% of the females in each group moved into the elevated body fat percentages category. However, 13% of the females in the control group moved from the high level to the normal level category by the end of the program.

† Covariates used: height, age, and baseline percent body fat

**Evidence Table 6b. Weight related outcomes for combined diet physical activity intervention studies taking place in a school only setting, by subgroup**

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
<b>BMI</b>																	
Broni-kowski, 2011 <sup>3</sup>	1	Boys - Control (n= 34)	34	18.0 (2.46)					65 (15 months)	34	18.7, (2.50)		130 (30 months)	34	19.2 (2.75)	1.2	
Broni-kowski, 2011 <sup>3</sup>	2	Boys – Experimental (n=38)	38	Median (SD) =18.4, (2.26)					65(15 months)	38	19.4, (2.84)		130(30 months)	38	19.9 (2.60)	1.5	ANOVA (F test) = F(2, 130) = 0.21 P = 0.81
Broni-kowski, 2011 <sup>3</sup>	3	Girls - Control (n=32)	32	18.1 (2.12)					65(15 months)	32	20.0, (2.57)		130(30 months)	32	20.0 (2.47)	0.9	
Broni-kowski, 2011 <sup>3</sup>	4	Girls – Experimental (n =33)	33	18.8 (2.35)					65(15 months)	33	20.2, (2.45)		130(30 months)	33	20.9 (2.60)	1.1	ANOVA (F test) = F (2, 106) = 0.56; P = 0.57
Haer-ens,2006 <sup>18</sup>	1	Males	278	18.58 (2.91)	43	278	18.99 (2.82)						95	239	19.67 (2.89)	1.09	In Boys, no significant positive intervention effects were found.
	2		708	19.32 (3.35)	43	708	19.98 (3.35)						95	611	20.86 (3.51)	1.54	
	3		665	19.24 (3.62)	43	665	19.79 (3.64)						95	590	20.52 (3.68)	1.27	
	1	Girls	393	19.23 (3.52)	43	393	19.94 (3.65)						95	352	20.78 (3.66)	1.55	
	2		130	20.23 (3.60)	43	130	20.94 (3.54)						95	118	21.66 (3.68)	1.43	
	3		451	20.26 (3.95)	43	451	20.75 (3.90)						95	381	21.34 (3.83)	1.08	
Llar-gues, 2012 <sup>27</sup>	1	Girls	237	16.2+/- 2.9					104		17.9		204	201	18.7	2.48+/- 2.06	P = 0.03

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
}	2	Girls	272	Median (SD) =17.0+/- 2.7;							17.8			225	18.9;	1.90+/- 1.94	
Llargues, 2012 <sup>27</sup>	1	Boys	237	16.6+/- 2.7					104	NR	18.4		204	201	19.5;	2.93+/- 2.06	Diff-erence in difference=2.93 (2.06); p <0.001
	2	Boys	272	Median (SD) =16.9+/- 2.1;							17.7			225	18.8;	1.96+/- 2.12	
Yin, 2005 <sup>63, 17</sup>	1	Subjects with 40% + attendance in intervention schools and subjects in control schools	265	19.3 (4.4)	34	265	19.6 (4.5)										
	2		182	19.4 (4.7)	34	182	19.5 (4.7)										Diff. in change in BMI; -0.16 (95% CI; -0.4, 0.07) P=0.18



Author, Year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
	1	Subjects with 40% + attendance in intervention schools and subjects in control schools	265	19.3 (4.4)	34	265	19.6 (4.5)										
	2		182	19.4 (4.7)	34	182	19.5 (4.7)										
Kain, 2009 <sup>24</sup>	1	Boys	348	19.4 (3.8)	39	348	19.5 (3.7)		52	348	20 (3.7)		91	348	20.6 (3.7)	1.2	
	2		749	19 (3.3)	39	749	18.8 (3.2)		52	749	19.1 (3.2)		91	749	19.7 (3.2)	0.7	
	1	Girls	225	19.4 (4)	39	225	19.6 (4)		52	225	20 (4)		91	225	20.8 (3.8)	1.4	
	2		717	19.3 (3.5)	39	717	19.2 (3.4)		52	717	19.6 (3.5)		91	717	20.1 (3.5)	0.8	
Trevino, 2005 <sup>51</sup>	1	Females	NR		39	94	19.90 (5.42)										The base-line check for group equivalence found no difference in PFS and BMI levels between the intervention and control groups. (The baseline results are not presented)
	2		NR		39	107	18.92 (4.87)										

Author, Year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
	1	Males	NR		39	93	19.18 (4.14)										The base-line check for group equivalence found no difference in PFS and BMI levels between the intervention and control groups. (The baseline results are not presented.)
	2		NR		39	93	19.23 (4.78)										
Kafa-tos, 2005 <sup>23</sup>	1	Boys	112	16.3 (0.23)	312	112	20.6 (0.41)						520	112	23.7 (0.45)	7.4	
	2		151	16.3 (0.17)	312	151	19.8 (0.29)						520	151	22.6 (0.34)	6.3	
	1	Girls	145	16.2 (0.18)	312	145	20.2 (0.32)						520	145	22.6 (0.34)	6.4	
	2		133	16.1 (0.18)	312	133	19.5 (0.32)						520	133	21.7 (0.32)	3.4	
Broni-kowski, 2011 <sup>3</sup>	1	Girls	32	18.1 (2.12)	60	32	20.0 (2.57)						120	32	20.0 (2.47)		
Broni-kowski, 2011 <sup>3</sup>	2	Girls	33	Median (SD) =18.8, (2.35)		33	20.2 (2.45)							33	20.9 (2.60)		First F/U: ANOVA: F(2,106)=0.56 p=0.57
Broni-kowski, 2011 <sup>3</sup>	1	Boys	34	18.0 (2.46)					60	34	18.7 (2.50)		120	34	19.2 (2.75)		
Broni-kowski, 2011 <sup>3</sup>	2	Boys	38	Median (SD) =18.4, (2.26)						38	19.4 (2.84)			38	19.9 (2.60)		Second F/U: ANOVA: F(2,130)¼0.21 p¼0.81
Graf, 2008 <sup>16</sup>	1	Obese											208		5 (1.2)		P value for total population <0.001

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from base-line(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
	2	Obese											208		5.6 (2.5)		
	1	Over-weight											208		3 (1.9)		
	2	Over-weight											208		3.9 (1.6)		
	1	Under-weight											208		-0.4 (1)		
	2	Under-weight											208		-0.2 (0.9)		
	1	normal weight											208		1.1 (1.2)		
	2	normal weight											208		1.5 (1.4)		
Stock, 2007 <sup>48</sup>	1	Grades k-3	61	16.6 (1.9)	43	61		0.2 (CI:0.0-0.3)									
	2	Grades k-3	100	16.6 (2.0)	43	100		0.2 (CI:-0.1-0.3)									Arm 2-Arm4 Difference between groups with respect to change in BMI: p=0.005
	1	Grades 4-7	71	18.3 (3.1)	43	71		0.7 (CI:0.5-0.9)									Arm 1-Arm3 Difference between groups with respect to change in BMI: >/=0.05 (NS)
	2	Grades 4-7	128	19.1 (3.6)	43	128		0.4 (CI:0.2 - 0.5)									
Kain, 2009 <sup>24</sup>	1	Boys															
	2	Girls															
<b>BMI z score</b>																	

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from base-line(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
Haerens, 2006 <sup>18</sup>	1	Males	278	-0.07 (1.09)	52	665	0.17 (1.03)						95	590	0.16 (1.04)	0.23	Not significant in 1st and 2nd year
	2		708	0.10 (1.02)		708	0.22 (0.97)						95	611	0.25 (0.98)	0.15	
	3		665	0.07 (1.98)		278	-0.07 (0.98)						95	239	-0.04 (0.94)	-0.11	
	1	Females	130	0.27 (0.96)		130	0.39 (0.90)						95	118	0.35 (0.96)	0.08	1 year effect not significant, 2nd year p<0.05
	2		393	-0.01 (1.06)		393	0.11 (1.03)						95	352	0.14 (1.00)	0.04	
	3		451	0.23 (1.12)		451	0.28 (1.08)		95-381		0.24 (1.06)		95	451	0.24 (1.06)	0.01	
Kain, 2009 <sup>24</sup>	1	Girls	225	0.64 (1)	39	225	0.59 (1)		52-225		0.57 (0.9)		91	225	0.72 (0.9)	0.08	
	2		717	0.64 (0.95)	39	717	0.51 (0.92)		52-717		0.50 (0.93)		91	717	0.58 (0.9)	-0.06	P<0.05
	1	Boys	348	0.67 (1.00)	39	348	0.65 (1)		52-348		0.65 (1)		91	348	0.72 (1)	0.05	
	2		749	0.62 (1)	39	749	0.44 (1)		52-749		0.42 (1)		91	749	0.52 (0.95)	-0.1	P<0.05
<b>% Obese</b>																	
Kain, 2009 <sup>24</sup>	1	Boys	348	21.6	39	348	19.7		52	348	19.4		91	348	21.4	-0.2	In Boys, the prevalence of obesity at baseline was significantly higher in the control group (21.6% v. 17.0%in the intervention group) (P<0.05)
	2		749	17	39	749	11.4		52	749	11.4		91	749	12.3	-4.7	
	1	Girls	225	14.7	39	225	12.6		52	225	11.8		91	225	15.2	0.5	
	2		717	14.1	39	717	10.3		52	717	9.9		91	717	10.3	-3.8	
Gort-maker, 1999 <sup>15</sup>	1	Fe-male	317	21.5	104		23.7	2.2									Adjusted odds; 1.00

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from base-line(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
	2		310	23.6	104		20.3	-3.3									Adjusted odds;0.47 (CI:0.24-0.93) P=0.03
	1	Male	337	34.7	104		31.8	-2.3									Adjusted odds; 1.00
	2		331	29.3	104		27.8	-1.5									Adjusted odds; 0.85 (CI:0.52-1.39) p=0.48
Llargues, 2012 <sup>27</sup>	1	Girls	95	8.4%	NR				104	95	9.8%		208	95	9.5%		NR
Llargues, 2012 <sup>27</sup>	2	Girls	109	Median (SD) =11.1%	NR					105	8.4%			105	7.3%		
Percent Over-weight																	
Kafatos, 2005 <sup>23</sup>	1	Boys	112	18.8	312	112	36.6		520	112	42					23.2	no differences between intervention and control groups were found to be significant at the 5% level.
	2		151	18.5	312	151	32.5		520	151	33.1					14.6	
	1	Girls	145	26.9	312	145	37.2		520	145	25.5					0.6	
	2		133	23.3	312	133	27.8		520	133	24.1					0.8	
Llargues, 2012 <sup>27</sup>	1	Girls	NR	15.8%/ 8.4%						NR	20.7%/ 9.8%		204	95	17.9%/ 9.5%	2.1%/ 1.1% Increase	NR
Llargues, 2012 <sup>27</sup>	2	Girls	NR	Median (SD) =26.9%/1 1.9%;							28.0%/ 8.4%		204	109	29.4%/ 7.3%	2.5% Increase/ 3.8% Decrease	
Percent body fat																	

Author, Year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
Yin, 2005 <sup>63, 17</sup>	1	Subjects with 40% + attendance in intervention schools and subjects in control schools	265	26.9 (9.7)	34	265	26.8 (9.7)									-0.1	
	2		182	26.5 (9.4)	34	182	25.8 (9.5)									-0.7	
Rush, E, 2012 <sup>40</sup>	1	5-7 yo	226	NR					104			0.76					
Rush, E, 2012 <sup>40</sup>	2	5-7 yo	200	NR					104			0.81					Difference in change = 0.00 (95% CI -0.06-0.06); p=0.98
Rush, E, 2012 <sup>40</sup>	1	10-12 yo	226	NR					104			0.76					
Rush, E, 2012 <sup>40</sup>	2	10-12 yo	200	NR					104			0.81					Difference in change = 0.05 (95% CI -0.04-0.13); p=0.35
Broni-kowski, 2011 <sup>3</sup>	1	Boys - Control (n= 34)	7.4 (1.7)					65 (15 months)	34	9.5 (1.9)		130 (30 months)	34	9.5(1.9)		2.1	

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from base-line(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
Broni-kowski, 2011 <sup>3</sup>	2	Boys - Experimental (n=38)	Median (SD) =9.2, (1.2)					65(15 months)	38	10.1 (1.4)		130(30 months)	38	10(1.4)		0.9	ANOVA (F test), Differences between groups in terms of changes in fat mass = F (2, 140) = 1.11; p=0.33
Broni-kowski, 2011 <sup>3</sup>	3	Girls - Control (n = 32)	36.3 (2.1)					65(15 months)	32	38.3 (1.8)		130(30 months)	32	38.2 (1.8)		1.9	
Broni-kowski, 2011 <sup>3</sup>	4	Girls - Experimental (n =33)	38.6 (1.7)					65 (15 months)	33	40.8 (1.4)		130(30 months)	33	40.8 (1.4)		2.2	ANOVA (F test), Differences between groups in terms of changes in fat mass = F (2, 126) = 0.99; p=0.99
Triceps skin fold thickness.																	

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
Kain, 2009 <sup>24</sup>	1	Boys	348	13.0 (6.3)	39	348	14.2 (6.5)		52	348	14.3 (6.9)		91	348	15.6 (6.8)	+2.6	Mean TSF for Boys from the intervention and control schools was 12.2 and 13.0 mm, respectively, at baseline; these rose accordingly, but the increase was greater in the control group.
	2		749	12.2 (5.8)	39	749	12.8 (5.5)		52	749	13.1 (5.8)		91	749	14.2 (6.3)	+2.0	
	1	Girls	225	14.7 (5.7)	39	225	15.9 (5.8)		52	225	16.6 (5.7)		91	225	18.9 (6.3)	+4.2	Mean TSF values over time for Girls from both groups were very similar, increasing progressively as expected, although the rise during the third period was considerably greater in the control Girls.
	2		717	14.8 (5.9)	39	717	15.4 (5.5)		52	717	16.0 (5.7)		91	717	17.5 (6.1)	+2.7	
	<b>Subscapular skinfold</b>																
Broni-kowski, 2011 <sup>3</sup>	1	Boys	34	53.6 (16.9)					60	34	50.6 (17.97)		120	34	42.2 (15.8)	-11.4	NR



Author, Year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
Broni-kowski, 2011 <sup>3</sup>	2	Boys	38	Median (SD) =45.6, (16.14)						38	41.1 (12.69)		120	38	35.1 (9.87)	-10.5	
<b>Sum of 4 BF measures</b>																	
Broni-kowski, 2011 <sup>3</sup>	1	Boys - Control (n= 34)	34	53.6 (16.90)					65(15 months)	34	50.6 (17.97)		130(30 months)	34	42.2 (15.80)	-11.4	
Broni-kowski, 2011 <sup>3</sup>	2	Boys - Experimental (n=38)	38	Median (SD) =45.6, (16.14)						38	41.1 (12.69)			38	35.1(9.87)	-10.5	
Broni-kowski, 2011 <sup>3</sup>	3	Girls - Control (n = 32)	32	71.6 (23.81)						32	70.7 (16.68)			32	69.3 (25.37)	-2.3	
<b>Body fat, Muscle mass</b>																	
Broni-kowski, 2011 <sup>3</sup>	1	Boys - Control (n= 34)		28.1 (2.3)					65 (15 months)	34	30.0; (2.4)		130(30 months)	34	31.8 (2.2)		
Broni-kowski, 2011 <sup>3</sup>	2	Boys – Experimental (n=38)		Median (SD) =26.3(1.9 )						38	32.0 (2.0)		130(30 months)	38	33.1 (1.8);	ANOVA (F test), Differences between groups in terms of changes in muscle mass, F(2, 140) = 3.81; p=0.02	
Broni-kowski, 2011 <sup>3</sup>	3	Girls – Control (n =32)		25.0 (1.4)						32	26.4 (1.8)		130 (30 months)	32	26.8 (1.4)		

Author, Year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
Broni-kowski, 2011 <sup>3</sup>	4	Girls – Experimental (n =33)		26.0 (1.2)						33	29.0 (1.3)		130 (30 months)	33	28.1 (1.2)	ANOVA (F test), Diff. between groups in terms of changes in muscle mass, F (2, 126) = 1.01; p=0.36	
Broni-kowski, 2011 <sup>3</sup>	4	Girls – Experimental (n =33)	33	54.2 (12.86)						33	58.1 (10.86)			33	48.8 (14.72)	ANOVA (F test), Differences between groups in terms of changes in sum of skinfolds, F (2,126) = 1.44; p=0.24	
Waist circ (cm)																	

Author, Year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
Yin, 2005 <sup>63, 17</sup>	1	Subjects with 40% + attendance in intervention schools and subjects in control schools.	265	62.6 (10.5)	34	265	63.9 (10.8)									-0.4	CI ( -1.1 to 0.4) P=0.32
	2		182	62.9 (11.5)	34	182	64 (11.4)									+1.1	
Kain, 2009 <sup>24</sup>	1	Boys	348	65.6 (10.6)	39	348	67 (10.5)		52	348	67 (10.1)		91	348	68.5 (9.4)	+2.9	Mean WC for Boys from both groups increase-ed similarly over time. In the intervention group there is a significant difference between follow up 1 and follow up 2 (P<0.05) and a significant difference between follow up 2 and follow up 3 (P<0.05).
	2		749	64.9 (9.7)	39	749	65.5 (9.4)		52	749	66.4 (9)		91	749	68 (8.8)	+3.1	

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from base-line(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
	1	Girls	225	64.9 (9.9)	39	225	65.5 (9.5)		52	225	65.8 (9.4)		91	225	67.7 (9.1)	+2.8	Mean WC values over time for Girls from both groups were very similar, increasing progress-ively as expected, from about 65 to 68 cm.
	2		717	64 (10.2)	39	717	66 (10)		52	717	65.7 (9.5)		91	717	67.3 (9.1)	+3.3	
Weight, Kg																	
Haerens, 2006 <sup>18</sup>	1	Females	393	48.49 (11.20)	43	393	51.93 (11.31)						95	352	56.30 (11.11)	+7.81	
	2		130	51.17 (11.70)	43	130	54.11 (11.70)						95	118	57.67 (11.71)	+6.5	
	3		451	50.97 (12.05)	43	451	53.82 (11.89)						95	381	57.02 (11.17)	+6.05	P>0.05
	1	Males	278	47.28 (11.22)	43	278	51.03 (11.84)						95	239	56.63 (11.95)	+9.35	
	2		708	49.79 (12.23)	43	708	54.15 (12.74)						95	611	60.17 (13.06)	+10.38	
	3		665	48.50 (12.16)	43	665	52.58 (12.95)						95	590	58.54 (13.28)	+10.04	P>0.05
Stock, 2007 <sup>48*</sup>	1	KG-3rd grade	61	25.4 (5.1)	43	NR	61	2.0 (CI:1.6-2.2)									
	2		100	24.5 (5.4)	43		100	2.3 (CI:2.0-2.5)									Diff. between groups with respect to change in weight: Arm 1- Arm 2 P=0.008
	1	4th-7th grade	71	39.9 (10.2)	43		71	3.9 (CI:3.2-4.6)									

Author, Year	Arm	Sub-group	Base-line N	Base-line measure , mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from baseline(SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean change from baseline (SD)	Measure of Association
	2		128	40.7 (11.0)	43		128	2.9 (CI:2.5-3.3)									Diff. between groups with respect to change in weight: Arm 1-Arm 2: p>=0.05 (NS)
Bronikowski, 2011 <sup>3</sup>	1	Boys - Control (n= 34)	34						65(15 months)	34	54.7 (10.03)					59.9 (9.76)	
Broni-kowski, 2011 <sup>3</sup>	2	Boys – Experimental (n=38)	38							38	54.8 (9.95)					60.9 (8.33)	ANOVA F test (Differences between groups in terms of changes in body mass) F(2,140) =0.04; p=0.95
Broni-kowski, 2011 <sup>3</sup>	3	Girls – Control (n = 32)	32							32	53.7 (7.63)					56.0 (9.21)	
Broni-kowski, 2011 <sup>3</sup>	4	Girls – Experimental (n = 33)	33							33	53.3 (5.68)					56.9 (6.78)	ANOVA F test (Differences between groups in terms of changes in body mass) = F (2,126) =1.35; p=0.26

ANOVA = Analysis of Variance, BMI = Body Mass Index, CI = Confidence Interval, Diff. = Differences; F/U = Follow Up, N = Sample Size; NR = Not Reported; NS = Not Significant, P =P-Value, PFS = Physical Fitness Score, SD = Standard Deviation; TSF = Triceps Skinfold Thickness; WC = Waist Circumference; yo = years old

\* Correlation between change in diet self-monitoring (GO foods)  
† Correlation between change in diet self-monitoring (WHOA foods)  
‡ Correlation between change in exercise self monitoring component of intervention

**Evidence Table 6c. Clinical outcomes for combined diet and physical activity intervention studies taking place in a school only setting, subgroups**

Author, year	Arm	Subgroup	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
DBP SDS									
Rush, E, 2012 <sup>40</sup>	1	5-7 yo	434		24 months	NR	0.87		difference in change=0.03 (95% CI -0.09-0.15); p=0.68
	2	5-7 yo	492			NR	0.9		
Rush, E, 2012 <sup>40</sup>	1	10-12 yo	226		24 months	NR	1.4		difference in change=-0.14 (95% CI -0.30-0.04); p=NR
	2	10-12 yo	200			NR	1.26		
SBP SDS									
Rush, E, 2012 <sup>40</sup>	1	5-7 yo	434		24 months		-0.41		difference in change = 0.03 (95% CI -0.11 - 0.16); p=0.79
	2	5-7 yo	492				-0.38		
Rush, E, 2012 <sup>40</sup>	1	10-12 yo	226		24 months	NR	0.05		difference in change = -0.23 (95% CI -0.43 - -0.02); p=0.16
	2	10-12 yo	200			NR	-0.18		

CI = Confidence Interval; DBP = Diastolic Blood Pressure; N = Sample Size; NR = Not Reported; p = p-value; SBP = Systolic Blood Pressure; SD = Standard Deviation; SDS = Standard Deviation Score; yo = Years old

Evidence Table 6d. Intermediate outcomes for combined diet and physical activity intervention studies taking place in a school only setting

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Change in physical activity								
Weekly hours								
Amaro, 2006 <sup>1</sup>	1--control	88		24 weeks		Adjusted mean number of hours of physical activity 2.2 (95% CI 2.0 to 2.4)		ANCOVA showed no significant difference between the treated group and control group at post-assessment controlling for baseline values.
	2--Kalèdo board game: designed to transfer knowledge about the healthy Mediterranean diet, in agreement with modern nutrition notions	153		24 weeks		Adjusted mean number of hours of physical activity per day was 2.1 (95% CI 1.9 to 2.3)		
Sahota, 2001 <sup>41</sup>	Control	322		One school year, 34 weeks				A positive value for weighted mean difference indicates higher food intake or activity levels in the intervention schools than the control schools. A value of zero indicates no difference.
	Intervention	314		One school year, 34 weeks				Weighted mean difference (95%CI)= -0.2 (-0.4 to 0.1)  NS
Hours/week in curriculum								
Valdimarsson , 2006 <sup>53</sup>	1 - control	50	1.0	52 weeks (12 mo)	50	1.0	0	At baseline and follow up: P<0.001 between control and intervention
	2- intervention - Malmo Pediatric Osteoporosis Prevention (POP) Study – increase in duration of PE curriculum/ time	53	3.3	52 weeks (12 mo)	53	3.3	0	
Hours/week outside school								
Valdimarsson , 2006 <sup>53</sup>	1 - control	50	1.3 (1.6)	52 weeks (12 mo)	50	1.9 (1.9)	0.6	At follow up: P<0.05 between control and intervention
	2- intervention - Malmo Pediatric Osteoporosis Prevention (POP) Study – increase in duration of PE	53	0.7 (1.2)	52 weeks (12 mo)	53	1.1 (1.3)	0.4	

	curriculum/time							
<b>Hours/week in curriculum and outside school</b>								
Valdimarsson, 2006 <sup>53</sup>	1 - control	50	2.3 (1.6)	52 weeks (12 mo)	50	2.9 (1.9)	0.6	At baseline and follow up: P<0.001 between control and intervention
	2- intervention - Malmo Pediatric Osteoporosis Prevention (POP) Study – increase in duration of PE curriculum/ time	53	4.0 (1.2)	52 weeks (12 mo)	53	4.4 (1.3)	0.4	
<b>30 min blocks/day</b>								
Neumark-Sztainer, 2010 <sup>36</sup>	Control		4.23 (3.65)	104		3.72	-0.51	
	Intervention		4.80 (3.52)	104		4.92	0.12	Follow-up Intervention effect= 1.20 P value= 0.068
<b>Moderate physical activity (h/d)</b>								
Barbeau, 2007 <sup>2</sup>	1 – control	83	0.32 (0.38)	10 months	83	0.37 (0.40)	0.21 (0.07, 0.34)	P=0.004
	2 – After-school PA program	118	0.31 (0.33)	10 months	118	0.57 (0.52)	0.26	
<b>Moderate physical activity (30 min blocks/d)</b>								
Neumark-Sztainer, 2010 <sup>36</sup>	Control		2.92 (2.98)	104		2.27	-0.65	
	Intervention		3.04 (2.84)	104		2.80	-0.24	Follow-up Intervention effect= 0.53 P value= 0.186
<b>Vigorous physical activity (h/d)</b>								
Barbeau, 2007 <sup>2</sup>	1	83	0.14 (0.26)	10 months	83	0.31 (0.56)	0.15 (-0.01, 0.31)	P=0.067
	2	118	0.15 (0.28)	10 months	118	0.44 (0.51)	0.19	
Jago, 2011 <sup>69*</sup>	1--control	NR	114.8 (79.6)	104 weeks	1800†	114.1 (78.3)	-0.7	P=0.21
	2—HEALTHy intervention: diet and PA impact on metabolic syndrome	NR	119.1 (80.4)	104 weeks	1886†	123.4 (80.9)	4.3	
Taylor, 2007 <sup>49</sup>	1	250		104 weeks (2 years)	151			
	2	219		104 weeks (2 years)	136		-0.2 (95% CI:-0.4, -0.0)	Intervention children reported less PA than the control children at year 2.
<b>Moderate to vigorous physical activity (h/d)</b>								
Barbeau, 2007 <sup>2</sup>	1	83	0.46 (0.44)	10 months	83	0.67 (0.61)	0.37 (0.16, 0.57)	P=0.0006
	2	118	0.46 (0.48)	10 months	118	1.00 (0.67)	0.54	
Gortmaker,	1	304	1.67	78 weeks (2	NR	1.74	0.07	0.36, -0.63 to 1.35, 0.43



1999 <sup>15</sup>				school years)				
Female	2	291	1.76	78 weeks (2 school years)	NR	1.87	0.11	
Gortmaker, 1999 <sup>15</sup>	1	319 2.47	2.47	78 weeks (2 school years)	NR	2.44	-0.03	-0.40, -1.00 to 0.20, 0.16
Male	2	314	2.54	78 weeks (2 school years)	NR	2.44	-0.01	
Manios, 2002 <sup>33</sup>	Control	285	74.6 (133.7)	312		244.2 (300.6)	174.5 SE(25.7)	
	Intervention	356	55.2 (116.0)	312		338.3 (361.5)	281.3 SE(22.0)	P value< 0.05
Manios, 2006 <sup>34</sup>	Control	187	74.4 SE(11.4)	520		61.2 SE(6.87)	-13.2 SE(10.9)	P value= 0.038
	Intervention	238	50.0 SE(8.78)	520		88.3 SE(8.04)	38.3 SE(11.7)	
Sallis, 2003 <sup>70</sup>	Control		122 (31)	104		104 (19)	-18	
Boys	Intervention		130 (48)	104		115 (25)	-15	Time X condition; F 0.04, p 0.839
Sallis, 2003 <sup>70</sup>	Control		96 (28)	104		91 (17)	-5	
Girls	Intervention		90 (20)	104		93 (18)	+3	Time X condition; F0.37, p0.548
<b>Prevalence of active commuting</b>								
Heelan, 2009 <sup>19</sup>	1--control	227	30%	78 weeks (2 school years)	NR	29%	-1%	At each time period post baseline, a significantly greater percentage of children actively commuted to and from the WSB schools compared with the control school (P < .05).
	2—Walking school bus	464	30%	78 weeks (2 school years)	NR	39%	9%	
<b>% Running in morning</b>								
Warren, 2003 <sup>59</sup>	1- control (be smart)	50	80	14-16 months, depending on phase of recruitment	44	90	10	Not Sig (NS), presumably at p<0.05 level
	2- intervention 1 – nutrition only (eat smart)	56	68		40	88	20	NS
	3- intervention 2 – PA only (play smart)	53	66		46	85	19	NS

	4- intervention 3- nutrition/PA (eat smart play smart)	54	76		42	91	15	NS
<b>% Running at lunch</b>								
Warren, 2003 <sup>59</sup>	1- control (be smart)	50	70	14-16 months, depending on phase of recruitment	44	66	-4	Not Sig (NS), presumably at p<0.05 level
	2- intervention 1 – nutrition only (eat smart)	56	62		40	54	-8	NS
	3- intervention 2 – PA only (play smart)	53	60		46	72	12	NS
	4- intervention 3- nutrition/PA (eat smart play smart)	54	60		42	68	8	NS
<b>Playground activities</b>								
Warren, 2003 <sup>59</sup>	Overall, of boys and girls			14-16 months, depending on phase of recruitment				No notable difference in activities of boys and girls at baseline or final stage
<b>Daily physical activity via accelerometer</b>								
Heelan, 2009 <sup>19</sup>								Statistically significant differences in total daily physical activity levels (physical activity levels were averaged over all time points) were found between the INT (78.01 [38.87] min/day) and CON (60.62 [27.70] min/day) participants (P< .05
	2—CHOPPS primarily to discourage consumption of fizzy drinks	15	1.9 (0.5)	52 weeks	NR	1.3 (0.6)	-0.6 (-1.0 to -0.1)	P=0.02
<b>Leisure time physical activity</b>								
Manios, 19 99 <sup>32</sup>	Control	149	1.4 SE(0.1)	156		2.0 SE(0.2)	0.4 SE(0.3)	
	Intervention	199	0.9 SE(0.1)	156		2.8 SE(0.2)	2.0 SE(0.3)	P value: 0.0005
<b>Physical Activity Index: Low-Activity</b>								
Rosario, 2011 <sup>39</sup>	1	233	72 (53.3)	26	143	48 (56.5)	-24	
	2	231	82 (5.0)	26	151	40 (47.1)	-42	
<b>Physical Activity Index: Moderate Activate</b>								

Rosario, 2011 <sup>39</sup>	1	233	35 (25.9)	26	143	26 (30.6)	-9	
	2	231	49 (29.9)	26	151	30 (35.3)	-19	
<b>Physical Activity Index: Vigorous Activity</b>								
Rosario, 2011 <sup>39</sup>	1	233	7 (5.2)	26	143	5 (5.9)	-2	P = 0.133
	2	231	10 (6.1)	26	151	10 (11.8)	0	P = 0.133
<b>MVPA</b>								
Lubans, 2012 <sup>29</sup>	1	179	32.0 (95% CI 24.7 to 42.1)	52	153	25.0 (95% CI 16.5 to 41.7)	-7	Adjusted difference in change (95% CI): -4.28 (-13.82 to 5.25)
	2	178	33.5 (95% CI 20.5 to 40.1)	52	141	21.5 (95% CI 15.9 to 28.9)	-12	Adjusted difference in change (95% CI): -4.28 (-13.82 to 5.25)
<b>Walks to school</b>								
Llargues, 2011, <sup>27</sup>	1				217	132 (73.3%)		0.038
	2					140 (64.5%)		
<b>Performs physical activity outside school</b>								
Llargues, 2011, <sup>27</sup>	1				217	135 (75.4%)		NS
	2					179 (82.5%)		
Change in sedentary activity								
Taylor, 2007 <sup>49</sup>	1	250		104 weeks (2 years)	151			
	2	219		104 weeks (2 years)	136			Data not provided in article, but in text, states that at baseline, intervention and control children reported similar amounts of TV viewing. There was no intervention effect observed for TV viewing time
<b>Change in sugar sweetened beverage consumption</b>								
Taylor, 2007 <sup>49</sup>	1	250		104 weeks (2 years)	151		4.6 (4.8)	
	2	219		104 weeks (2 years)	136		6.0 (4.2)	-1.2 (95%CI:2.3, -0.2)  p=0.02

								Difference between intervention and control groups at year 2 adjusted for age, sex and year 1 intake. Presented as an absolute value because intakes were normally distributed.
<b>Change in fruit and vegetable intake</b>								
Taylor, 2007 <sup>49</sup>	1	250		104 weeks (2 years)	151		5.4 (2.8)	
	2	219		104 weeks (2 years)	136		4.5 (2.8)	0.8 (95%CI: 0.5, 1.1)  p<0.01  Difference between intervention and control groups at year 2 adjusted for age, sex and year 1 intake. Presented as an absolute value because intakes were normally distributed.
<b>Change in dietary intake</b>								
<b>Vegetable intake</b>								
Amaro, 2006 <sup>1</sup>	1	88		24 weeks		Adjusted mean number of servings per week 2.8 (95% CI 2.4 to 3.3)		Mixed model ANCOVA showed a significant difference between treated group and control group at post-assessment [F(1,14)=21.2; p<0.01] for the variable vegetable intake.
	2	153		24 weeks		Adjusted mean number of servings per week was 3.7 (95% CI 3.5 to 4.1)		
Warren, 2003 <sup>59</sup>	1- control (be smart)	39	5.2	14-16 months, depending on phase of recruitment	22	5.3	0.1	Not Sig (NS), presumably at p<0.05 level
	2- intervention 1 – nutrition only (eat smart)	48	4.4		20	5.3	0.9	NS
	3- intervention 2 – PA only (play smart)	33	5.3		23	5.5	0.2	NS
	4- intervention 3- nutrition/PA (eat smart play smart)	38	4.5		21	5.0	0.5	NS
Warren, 2003 <sup>59</sup>	“Overall” (not otherwise specified, but presumably all groups – groups 1-4 as			14-16 months, depending on				P<0.05 (final stage significantly higher than at initial stage)

	described above)			phase of recruitment				
<b>Fruit intake</b>								
Warren, 2003 <sup>59</sup>	Males (not otherwise specified, but presumably overall across all groups – groups 1-4 as described above)			14-16 months, depending on phase of recruitment				P<0.01 (final stage significantly higher than at initial stage)
<b>Fruit and vegetable intake</b>								
Gortmaker, 1999 <sup>15</sup>	1	284	4.1	78 weeks (2 school years)	NR	3.9	-0.2	+0.32, 0.14 to 0.50, .003
Female	2	280	3.4	78 weeks (2 school years)	NR	3.6	+0.2	
Gortmaker, 1999 <sup>15</sup>	1	296	4.1	78 weeks (2 school years)	NR	3.6	-0.5	0.18, -0.21 to 0.56, .31
Male	2	297	3.8	78 weeks (2 school years)	NR	3.6	-0.2	
Neumark-Sztainer, 2010 <sup>36</sup>	Control		1.60 (1.76)	104		1.82	0.22	
	Intervention		1.96 (2.18)	104		2.06	0.10	Follow-up Intervention effect= 0.24 P value= 0.365
Tucker, 2011 <sup>52</sup>	School A (EHS) 1- control (Let's Go 5-2-1-0)	29		Approx 26 weeks; 6 mos (late October 2008 – early May 2009) – but dates not specified		3.0		P=0.032, comparing control and intervention at end of intervention
	School A (EHS) 2- intervention (Let's Go 5-2-1-0 + 1:1 counseling etc.)	41		Approx 26 weeks; 6 mos (late October 2008 – early May 2009) – but dates not specified		3.7		
Tucker, 2011 <sup>52</sup>	School A – intervention & control combined, with the reason that there were few differences found between control & intervention groups at baseline	70	3.6 (3 = median; 1-13 = range)	Approx 26 weeks; 6 mos (late October 2008 – early May 2009) – but dates not specified	65	3.4 (3 = median; 1-7 = range)	-0.2	p=0.75
<b>24 hour recall vegetable intake</b>								
Sahota, 2001 <sup>41</sup>	Control	322		One school year, 34				A positive value for weighted mean difference indicates higher food intake or activity levels in the intervention

				weeks				schools than the control schools. A value of zero indicates no difference.
	Intervention	314		One school year, 34 weeks				Weighted mean difference (95%CI)= 0.3 (0.2 to 0.4)
<b>Change in sugar sweetened beverages</b>								
Neumark-Sztainer, 2010 <sup>36</sup>	Control		1.04 (1.31)	104		1.30	0.26	
	Intervention		1.33 (1.65)	104		1.25	-0.08	Follow-up Intervention effect= 0.05 P value= 0.751
Tucker, 2011 <sup>52</sup>	School A – intervention & control combined, with the reason that there were few differences found between contol & intervention groups at baseline	70	0.8 (0 = median; 0-8 = range)	Approx 26 weeks; 6 mos (late October 2008 – early May 2009) – but dates not specified	65	0.7 (0 = median; 0-8 = range)	-0.1	p=0.43
Coleman, 2012 <sup>8</sup>	1	300	0.32 (0.12)	104	216	0.28 (0.15)	-0.5	
	2	279	0.26 (0.11)	104	208	0.09 (0.05)	-0.15	
<b>24 hour recall foods and drinks high in sugar</b>								
Sahota, 2001 <sup>41</sup>	Control	322		One school year, 34 weeks				A positive value for weighted mean difference indicates higher food intake or activity levels in the intervention schools than the control schools. A value of zero indicates no difference.
	Intervention	314		One school year, 34 weeks				Weighted mean difference (95%CI) for all children = -0.5 (-1.1 to 0.1)
<b>Change in carbonated drinks with sugar</b>								
Heelan, 2009 <sup>19</sup>	1	14	1.1 (0.6)	52 weeks	NR	1.2 (0.5)	0.0 (-0.3 to 0.4)	0.1 (-0.4 to 0.5)
	2	15	1.2 (0.3)	52 weeks	NR	0.9 (0.6)	-0.3 (-0.6 to 0.1)	P=0.9 P=0.2
<b>Change in energy intake Energy from % fat</b>								
Bush, 1989 <sup>6</sup>	1	27		2 years			-0.46 +/- 2.24	0.841  Values are difference btw intv and control. Adjusted for (BL, age, sex, SES): -0.35 +/- 1.41 p=0.808
	2	49		2 years				

Gortmaker, 1999 <sup>15</sup> Female	1	285	31.0	78 weeks (2 school years)	NR	29.8	-1.2	-0.67, -1.43 to 0.09, .07
	2	282	31.2	78 weeks (2 school years)	NR	29.4	-1.8	
Gortmaker, 1999 <sup>15</sup> Male	1	296	31.5	78 weeks (2 school years)	NR	30.5	-1.0	-0.31, -1.10 to 0.48, .38
	2	296	32.0	78 weeks (2 school years)	NR	30.5	-1.5	
Manios, 1999 <sup>32</sup>	Control	63	96.8 SE(3.8)	156		110.6 SE(3.1)	9.0 SE(4.4)	
	Intervention	76	99.2 SE(3.9)	156		109.2 SE(3.3)	8.3 SE(6.3)	NS
Manios, 2002 <sup>33</sup>	Control	86	86.8 (25.0)	312		103.9 (31.7)	18.8 SE(3.5)	
	Intervention	90	87.0 (23.9)	312		92.0 (30.5)	5.9 SE(4.1)	P value< 0.05
Manios, 2006 <sup>34</sup>	Control	66	85.9 SE(2.95)	520		96.4 SE(5.71)	10.6 SE(6.39)	P value= 0.406
	Intervention	70	86.5 SE(3.05)	520		106.0 SE(5.72)	19.5 SE(5.82)	
Tucker, 2011 <sup>52</sup>	School A – intervention & control combined, with the reason that there were few differences found between control & intervention groups at baseline	70	1.2 (1 = median; 0-5 = range)	Approx 26 weeks; 6 mos (late October 2008 – early May 2009) – but dates not specified	65	1.1 (1 = median; 0-3.5 = range)	-0.1	p=0.72
24 hour recall foods high in fat								
Sahota, 2001 <sup>41</sup>	Control	322		One school year, 34 weeks				A positive value for weighted mean difference indicates higher food intake or activity levels in the intervention schools than the control schools. A value of zero indicates no difference.
	Intervention	314		One school year, 34 weeks				Weighted mean difference (95%CI) for all children = 0.1(-0.2 to 0.4)
Energy from % saturated fat								
Bush, 1989 <sup>6</sup>	1	27		2 years			-0.71 +/-0.90	0.490
	2	49		2 years				Values are difference btw intv and control. Adjusted for (BL, age, sex, SES): -0.75 +/- 0.69 p=0.284
Total energy (J/d)								
Gortmaker, 1999 <sup>15</sup> Female	1	285	8122.8	78 weeks (2 school years)	NR	9009	+886.2	-575.4, -1155 to 0, 0.05
	2	282	7526.4	78 weeks (2 school years)	NR	8156.4	+ 630	

Gortmaker, 1999 <sup>15</sup> Male	1	296	9445.8	78 weeks (2 school years)	NR	10 147.2	+701.4	-466, -1094 to 164, 0.13
	2	298	9361.8	78 weeks (2 school years)	NR	9815.4	+453.6	
Manios, 1999 <sup>32</sup>	Control	63	1,867.5 SE(55.5)	156		2,180.5 SE(53.0)	296.8 SE(69.6)	
	Intervention	76	1,872.8 SE(91.7)	156		2,169.2 SE(50.7)	269.7 SE(99.1)	NS
Manios, 2002 <sup>33</sup>	Control	86	7718.6 (1832.2)	312		9162.1 (2174.4)	1534.7 SE(240.6)	
	Intervention	90	7709.4 (1815.0)	312		8332.0 (2218.8)	747.7 SE(276.6)	P value< 0.05
Manios, 2006 <sup>34</sup>	Control	66	7602.8 SE(209.1)	520		8848.9 SE(412.7)	1246.1 SE(450.4)	P value= 0.322
	Intervention	70	7728.4 SE(239.7)	520		9700.3 SE(467.6)	1971.8 SE(494.4)	
<b>Change in energy intake (kcal/day)</b>								
Rosario, 2011 <sup>39</sup>	1	233	2024.2 (581.8)	26	143	2475.6 (684.9)	415.4	P = 0.399
	2	231	2091 (683.9)	26	151	2388.0 (1036.5)	297.0	P = 0.399
Fung, 2012 <sup>14</sup>	1		1924	26		1897	-27	P = 0.31
	2		2094	26		1844	250	P <0.01
<b>Change in fruit and vegetable intake</b>								
Fung, 2012 <sup>14</sup>	1		4.88	26		4.73	-0.15	P = 0.09
	2		4.6	26		5.08	0.48	P = 0.02
Coleman, 2012 <sup>8</sup>	1	300	0.26 (0.19)	104	216	0.37 (0.28)	0.11	
	2	279	0.20 (0.11)	104	208	0.17 (0.11)	-0.03	
<b>Added Sugar Beverages (oz/day)</b>								
DeBar, 2011 <sup>10</sup>	1			156	2296	14.3 (15.2)		P = 0.31
	2			156	835	12.5 (12.3)		P = 0.31
	3			156	1472	13.5 (13.9)		P = 0.31
<b>Fruits and vegetables (servings/day)</b>								
DeBar, 2011 <sup>10</sup>	1			156	2296	2.3 (2.0)		P = 0.23
	2			156	835	2.4 (2.0)		P = 0.23
	3			156	1472	2.4 (2.1)		P = 0.23
<b>Daily energy intake, kcal/d</b>								
Lubans, 2012	1	179	2241.2	52	153	2233.8 (1551.9)	-7.4	Adjusted difference in change (95% CI): -62.0(-464.2 to



<sup>29</sup>			(1259.8)					340.3)
	2	178	2598.8 (1763.6)	52	141	2524.8 (1610.0)	- 74.0	Adjusted difference in change (95% CI): -62.0(-464.2 to 340.3)
Lubans, 2012 <sup>29</sup>	1	179	36.7 (106.4 to 214.2)	52	153	33.1 (93.9 to 193.6)	-3.6	Adjusted difference in change (95% CI): -0.52(-7.31 to 62.7)
	2	178	35.6 (110.4 to 222.3)	52	141	35.7 (98.4 to 226.5)	0.1	Adjusted difference in change (95% CI): -0.52(-7.31 to 62.7)
<b>Takes 2nd portion of fruit everyday</b>								
Llargues, 2011, <sup>27</sup>	1				217	64 (36.6%)		NS
	2					95 (43.8%)		
<b>Eats vegetables more than once daily</b>								
Llargues, 2011, <sup>27</sup>	1				214	59 (33.3%)		NS
	2					75 (35.0%)		
<b>Eats fast food one or more times weekly</b>								
Llargues, 2011, <sup>27</sup>	1				176	12 (6.8%)		NS
	2					15 (6.9%)		
<b>Takes sweets several times daily</b>								
Llargues, 2011, <sup>27</sup>	1				216	16 (9.0%)		NS
	2					9 (4.2%)		
<b>Takes pastries as an afternoon snack more than 3 times daily</b>								
Llargues, 2011, <sup>27</sup>	1				217	24 (13.6%)		NS
	2					18 (8.3%)		
<b>Takes soft drinks more than 3 times weekly</b>								
Llargues, 2011, <sup>27</sup>	1				216	31 (17.5%)		NS
	2					30 (13.9%)		
<b>Performs sedentary activity &gt; 2 hours daily</b>								
Llargues, 2011, <sup>27</sup>	1				216	45 (25.0%)		NS
	2					47 (21.8%)		
<b>Change in sedentary activity</b>								
Sahota, 2001 <sup>41</sup>	Control	322		One school year, 34				A positive value for weighted mean difference indicates higher food intake or activity levels in the intervention

				weeks				schools than the control schools. A value of zero indicates no difference.
	Intervention	314		One school year, 34 weeks				Weighted mean difference (95%CI)= 0.0 (-0.1 to 0.1)
Sallis, 2003 <sup>70</sup>	Control		4.68 (0.86)	104		3.87 (0.71)	-0.81	NS
Boys	Intervention		4.65 (0.78)	104		4.42 (0.75)	-0.23	Time X condition; F0.16, p0.693
Sallis, 2003 <sup>70</sup>	Control		4.68 (.86)	104		4.61 (0.85)	-0.07	NS
Girls	Intervention		4.58 (0.74)	104		4.64 (0.69)	0.06	Time X condition; F0.14, p0.709
<b>TV hours per day</b>								
Gortmaker, 1999 <sup>15</sup>	1—control	304	3.1	78 weeks (2 school years)	NR	2.99	-0.11	Adjusted difference, 95% CI, P: -0.58, -0.85 to -0.31, .001
Female	2—Plante health: education on diet, PA and TV time	289	2.98	78 weeks (2 school years)	NR	2.28	-0.70	
Gortmaker, 1999 <sup>15</sup>	1	319	3.78	78 weeks (2 school years)	NR	3.43	-0.35	-0.40, -0.56 to -0.24, .0003
Male	2	313	3.73	78 weeks (2 school years)	NR	3.03	-0.70	
Tucker, 2011 <sup>52</sup>	School A – intervention & control combined, with the reason that there were few differences found between contol & intervention groups at baseline	70	116.6 (120 = median; 0-600 = range)	Approx 26 weeks; 6 mos (late October 2008 – early May 2009) – but dates not specified	65	81.7 (60 = median; 0-420 = range)	-34.9	p=0.001
<b>30 min blocks/day</b>								
Neumark-Sztainer, 2010 <sup>36</sup>	Control		31.4 (3.89)	104		32.3	0.09	
	Intervention		31.0 (3.82)	104		31.0	0	Follow-up Intervention effect= 1.26 P value= 0.050
<b>TV (30 min blocks/d)</b>								
Neumark-Sztainer, 2010 <sup>36</sup>	Control		2.44 (2.66)	104		2.34	-0.10	
	Intervention		2.78 (2.80)	104		2.29	-0.49	Follow-up Intervention effect= 0.05 P value= 0.883
<b>Physical Activity Index: Sedentary</b>								
Rosario, 2011 <sup>39</sup>	1	233	21 (15.6)	26	143	6 (7.1)	-15	
	2	231	23 (14.0)	26	151	5 (5.9)	-18	
<b>Sedentary Behavior: Daily screen time</b>								
Lubans, 2012	1	179	220.7 (95%	52	153	248.6 (95% CI 177.9 to 355.7)	27.9	Adjusted difference in change (95% CI): -30.67 (-62.43 to-

<sup>29</sup>			CI 16.27 to 341.8)					1.06)
	2	178	240.0 (95% CI 161.8 to 368.6)	52	141	231.4 (95% CI 161.7 to 375.4)	-8.6	Adjusted difference in change (95% CI): -30.67 (-62.43 to-1.06)
<b>Sedentary Behavior: weekday screentime</b>								
Lubans, 2012 <sup>29</sup>	1	179	209.0 (95% CI 156.0 to 289.0)	52	153	236.0 (95% CI 156.0 to 333.5)	25	Adjusted difference in change (95% CI): -25.39 (-54.14 to3.36)
	2	178	216.0 (95% CI 142.5 to 349.5)	52	141	222.0 (95% CI 142.5 to 326.1)	6	Adjusted difference in change (95% CI): -25.39 (-54.14 to3.36)
<b>Sedentary Behavior: weekend screen time</b>								
Lubans, 2012 <sup>29</sup>	1	179	255.0 (95% CI 150.0 to 420.0)	52	153	300.0 (95% CI 180.0 to 420.0)	45	Adjusted difference in change (95% CI): -42.90(-100.41 to 14.61)
	2	178	300.0 (95% CI 178.8 to 450.0)	52	141	285.0 (95% CI 180.0 to 420.0)	-15	Adjusted difference in change (95% CI): -42.90(-100.41 to 14.61)

ANCOVA = Analysis of Covariance; BL = Baseline value; CI = Confidence Interval; CON = Control; d = day; EHS = Elton Hills Elementary; h/d = hours per day; INT = Intervention; J/d = joules per day; kcal = kilocalories; mo = month; mos = months; MVPA = Moderate to Vigorous Physical Activity; N = Sample Size; NR = Not Reported; NS = Not Significant; oz = ounce; p = p-value; PA = Physical Activity; PE = Physical Education; POP = Pediatric Osteoporosis Prevention; SD = Standard Deviation; SE = Sample Error; SES = Socio-Economic Status; Time X condition = survey time correlated with intervention condition; WSB = Walking School Bus

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## Key Question 1. School-home based

**Evidence Table 7. Study characteristics for studies taking place in a school setting with a home component**

Author, year Location	Years of recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Burke, 1998 <sup>1</sup> Australia	1993	Randomized intervention	NR	No/Not reported	With sampling stratified by socioeconomic status 989 children from 18 schools were invited to take part. Schools were randomized to act as controls, receiving only the standard school curriculum (five schools) or to receive the up-dated WASPAN nutrition and physical activity program (13 schools). Of the 13 WASPAN schools, seven were randomly chosen for a physical activity enrKCPichment program targeting only children with higher levels of cardiovascular risk. In the other six WASPAN schools, both higher and lower risk children received only the WASPAN programs. The cardiovascular risk was based on systolic blood pressure, physical fitness, percent body fat, and blood cholesterol.
Caballero, 2003 <sup>2</sup> US	NR	Randomized intervention	Grade: 3rd grade Ethnicity: American Indian/Alaska Native School selection was based on a projected 3rd grade enrollment of >15 children, 90% of 3rd grade children of American Indian ethnicity, retention from 3rd to 5th grade over the past 3 yrs of >70%, school meals prepared and administered on site, availability of minimum facilities to deliver a physical activity program at the school, and approval of the study by school, community, and tribal authorities.	Yes	
Coleman, 2005 <sup>3</sup> US	1998	A pretest-posttest, matched control group, quasi-experimental design.	NR	Yes	Participants were third grade children predominantly Hispanic.
Danielzik, 2007 <sup>4</sup> Germany	1996	Randomized intervention	There were no eligibility criteria except willingness to participate.	Yes	Abstracted from Plachta-Danielzik, 2011 <sup>5</sup> .
Dzewaltowski, 2010 <sup>6</sup> US	2005	Nested cross-sectional group randomized controlled trial	Students in the after-school program were excluded if they were not in the 3rd or 4th grand or if they participated in the program in the previous year.	Yes	A three-year group-randomized controlled trial was conducted with random assignment at the school level after a baseline year of assessment (Figure 1). The study used a nested cross-sectional design with a baseline year (2005-2006), and two subsequent intervention years (2006-2007, 2007-2008). For each year of the

Author, year Location	Years of recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
					<p>study, new children in fourth grade and in after-school programs participated in the study. By using a “repeated cross-section” methodology the outcomes were tracked for the same places rather than for the same individuals [12]. If this study used a longitudinal design and attempted to follow students over three years, it is likely that participant dropout would have exceeded 30%.</p> <p>Study used a “repeated cross-section” methodology where the outcomes were tracked for students in the same grade (4th grade students over sequential years) rather than for the same students over time due to concern for dropout.</p> <p>Schools were stratified into two groups (High SES/Low Diversity; Low SES/High Diversity) based on the percentage of students who qualified for free and reduced lunch, and race/ethnic diversity. Schools were matched group within each group and randomized to intervention or control.</p> <p>The study had two components: an after-school component and a during-school component.</p>
Foster, 2008 <sup>7</sup> US	NR	Randomized intervention	Grade: K-8th grade Ten schools were selected from among 27 Kindergarten through eighth grade schools with at least 50% of students eligible for free or reduced-price meals.	Yes	<p>Schools were the unit of randomization and intervention.</p> <p>To obtain pairs of 2 schools per cluster, the 27 schools were first organized into 5 clusters of 4 to 7 schools each, based on school size and type of food service (e.g., full service [2 clusters] or heat and serve [3 clusters]). Schools within each cluster were approached to participate in a predetermined, random order. When 2 schools in each cluster agreed to participate, the schools were randomly assigned as intervention or control schools.</p>
Hatzis, 2010 <sup>8</sup> Greece	1992	NR	NR	No/Not reported	This article reports on the 10 year follow up data; does not go in depth about initial intervention
Hendy, 2011 <sup>9</sup> US	NR	Randomized intervention	Needed to be a student at the school for throughout the KCP program.	Yes	This study extends a previous evaluation of the KCP program from a one-month application to a three-month application.

Author, year Location	Years of recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
			Needed to not have severe disabilities that would make it difficult for the child to understand the program.		
Hoelscher, 2010 <sup>10</sup>  US	2007	Non-randomized intervention	NR	Yes	All 4th grade students in the 30 CATCH BP/BPC measurement schools were invited to participate in a self-administered survey along with measurement of height and weight. In addition, one class each of 3rd, 4th, and 5th grade students was randomly selected for direct observations of student PA during PE class.
Hollar, 2010 <sup>11</sup>  US	2004	Non-randomized intervention	NR	Yes	Children in elementary schools.
Hopper, 2005 <sup>12</sup>  US	NR	Randomized intervention	NR	No/Not reported	Participants are third grade students in elementary schools.
Kriemler, 2010 <sup>13</sup>  Switzerland	2004-2005	cluster randomized controlled trial	Grade: 1st and 5th Participating schools fulfilled our eligibility criteria: rural or urban localization, a prevalence of 10-30% migrants as in the Swiss population, and the presence of at least a first grade and a fifth grade class in each school.	Yes	Randomization was conducted at the school level.  Baseline (August 2005) and follow-up (June 2006) measurements took place at school within the same three week period for all children; the intervention period lasted nine months.
Lionis, 1991 <sup>14</sup>  Greece	1987	Non-randomized intervention	Age: >13 - <14 Grade: last class of high school Students who attended the last class of high school (13-14 years old) in the two rural areas of the Agios Vassilios and the Amari provinces in Crete were selected as the target population for the intervention study.	No/Not reported	
Manios, 1998 <sup>15</sup>  Greece	1992	Non-randomized intervention	Grade: 1 Participants in the intervention group are students from two counties in Crete (Iraklio and Rethimno) while the students in the control group are from Chania.	No/Not reported	
Marcus, 2009 <sup>16</sup>  Sweden	2001-2004	Cluster-randomized controlled, plus pre-, post-test, & continuous test designs for certain measures	NR	Yes	The study utilized a cluster-randomized, controlled design. Note that the research design was mixed with a cluster-randomized design pre- and post-test for assessing changes in Body Mass Index standard deviations score (BMI sds) and a cluster-randomized continuous test design for the measurement. A post-test design was used for eating behavior assessments.
Mihas, 2010 <sup>17</sup>	2007	Randomized	Age: >12 - <13	Yes	"In the study, 342 adolescents aged 12–13 years who were

Author, year Location	Years of recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Greece		intervention	Grade: 7 No subjects who had an organic cause for high or low weight  No subjects who received any medication that might interfere with growth or weight control  No subjects who were on specific diets		students (7th grade) of all (n 5) high schools located in Vyronas district, Athens, Greece, were initially eligible." So aged 12-13 and grade 7 is an inclusion criterion?
Nader, 1999 <sup>18</sup>  US	1991	Randomized intervention	Grade: this follow up is specific to those in grade 3 at baseline 1991 and followed up in 1997 (grade 8)	Yes	This study is a 3 year follow-up study of the Catch II study, to determine whether changes observed at the end of the intervention (grade 5) were maintained through grade 8.  Study characteristics were not explicitly reported here in detail: may have to look at these references for intervention design: Perry CL, Stone EJ et al, (1990) School-based cardiovascular health promotion: the child and adolescent trial for adolescent health (CATCH). J Sch Health 60(8): 406-13.  Zucker DM, Lakatos E, Webber LS, et al. (1995) Statistical design of the child and adolescent trial for adolescent health (CATCH): implications of cluster randomization. Control Clin Trials. 16:96-118.  and Luepker RV, Perry CL, McKinlay SM, et al. (1996) Outcomes of a field trial to improve children's dietary patterns and physical activity: the child and adolescent trial for adolescent health (CATCH). JAMA 275: 768-76.
Robinson, 1999 <sup>19</sup>  US	1996	Randomized intervention	Grade: 3-4	Yes	
Schetzina, 2009 <sup>20</sup>  US	2005	Non-randomized intervention	NR	Yes	The study school was identified by the Tennessee Department of Education as having over 50% of its students classified as economically disadvantaged.
Shofan, 2011 <sup>21</sup>  Israel	2004	Non-randomized intervention	NR	Yes	

Author, year Location	Years of recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Simon, 2008 <sup>22</sup>  France	2002	Randomized intervention	NR	Yes	Cluster-randomized controlled intervention study, started in fall 2002, is based on a randomization of the intervention status at school level, with stratification on socio-geographical criteria.  To ensure a broad socioeconomic representation, school randomization was stratified on geographical location, city size and location (or not) in a low economic neighborhood. Four pairs of matched schools were randomly selected out of the 77 public middle schools of the Department of Bas-Rhin (Eastern France). Intervention status of the schools was randomized in each pair of schools.
Simonetti D'Arca, 1986 <sup>23</sup>  Italy	1982	Non-randomized intervention	NR	Yes	
Speroni, 2007 <sup>24</sup>  US	2006	Non-randomized intervention	Study eligibility criteria excluded children who were unable or unwilling to perform physical fitness activities or to complete food and activity study questionnaires and diaries. When participants were originally screened, no children were excluded based on these criteria.	Yes	There is a low response rate for children who chose to take part in the study, "letters were distributed to the approximately 1,700 parents of students in grades 2 through 5 at the four schools. A total of 194 children enrolled in the study."
Trevino, 2004 <sup>25</sup>  US	2001	Randomized intervention	Age: <: 12 years Grade: Fourth grade Those in elementary schools with no previous exposure to Bienestar, students not previously diagnosed as having type 1 or type 2 diabetes mellitus, students without extreme dietary values, and students with 3-day average calorie intakes of greater than 800 and less than 4800. Students not in alternative schools were also included.	No/Not reported	
Story, 2012 <sup>26</sup>  US	2005	Randomized intervention	Grade: Kindergarten	Yes	Inclusion/Exclusion criteria were not very clear. Study aim was to conduct intervention among American Indian population (specifically Lakota). By having intervention on the reservation, it was assumed the vast majority of participants would be American Indian, but ethnicity itself was not an exclusion/inclusion criteria reported.
Brandstetter, 2012 <sup>27</sup>	NR2006	Randomized intervention	Grade: Second grade	Yes	

Author, year Location	Years of recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Germany					
Llargues, 2011 <sup>28</sup>  Spain	2006-2006	Randomized intervention	Grade: First year of primary schooling  The exclusion criteria were school children who need a special diet for a metabolic or digestive disorder, physical activity incapacity, no family acceptance or attendance to school	Yes	Cluster randomized prospective study with two parallel arms. The 16 schools were grouped into strata, depending on whether they were public or not, and they had the same number of classes of first primary course. Each school in the groups was randomly assigned to the control or intervention group. Follow-up is two school years. Not reported in weeks.
Lloyd, 2012 <sup>29</sup>  England	2008-2008	Randomized intervention	Age: 9-10 years old,  Grade: Year 5 class (9 to 10 year olds)  All state primary and junior schools in Exeter were eligible to take part if they had at least one single age Year 5 class (9 to10-year-olds) (ie, not mixed classes, 8 to10- or 9 to11-year-olds). Schools were recruited via the local network of primary school head teachers	Yes	Recruited participants at the school-level.
Williamson, 2012 <sup>30</sup>  US	2006	Randomized intervention	Grade: Grades 4-6  From rural communities	Yes	Supplementary article used only for recruitment data
Siegrist, 2011 <sup>31</sup>  Germany	2006-2007	Randomized intervention	Grade: Grades 2 & 3  Sixty primary schools throughout Bavaria, Germany were invited by mail or telephone to take part in this project Inclusion criteria at the student level: (1) attendance in the second or third grade and (2) written consent from parents	No/Not reported	Randomization was at the school level

CATCH BP = Coordinated Approach to Child Health Basic Plus; CATCH BPC = CATCH BP and Community; K-8 = Kindergarten through 8<sup>th</sup> grade; KCP = Kid's Choice Program; PA = Physical Activity; PE = Physical Education; SDS = Standard deviation score; SES = Socio-Economic Status; WASPAN = West Australian Schools Physical Activity and Nutrition Project

**Evidence Table 8. Participant characteristics for studies taking place in a school setting with a home component**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Burke, 1998 <sup>1</sup>	800	26 weeks	49.0% Overall: 392 Arm1: 116 Arm2: 133 Arm3: 143	11.0 Arm1: 10.7 (0.31) Arm2: 10.7 (0.34) Arm3: 10.7 (0.35)	NR	Grade 6 Overall: 800 (100)	
Caballero, 2003 <sup>2</sup>	1704	156 weeks	Not reported	Overall: 7.6 (0.6)	≥ 90.0% American Indian	Grade 3	According to the study there were no significant interactions by sex; therefore, data are shown with values from boys and girls combined.
Coleman, 2005 <sup>3</sup>	896	104 weeks	47.2% Arm1: 224 Arm2: 199	NR	93.0% Hispanic	3rd grades Overall: 896 (100)	Children were followed up into fourth and fifth grades. For aerobic fitness only, children were also tested in the sixth grade.
Danielzik, 2007 <sup>4</sup>	1764	12-416 weeks	50.5% Arm1: (51.2) Arm2: (49.7)	Arm1: 6.3 Range: 6.0-6.5 Arm2: 6.3 Range: 5.9-6.5	NR	1st grade	
Dzewaltowski, 2010 <sup>6</sup>	273	104weeks	50% Overall:135 (49.5) Arm1: 57 (46) Arm2: 78 (53)	Arm1: mean: 9.19 (0.66) Arm2: mean: 9.34 (0.65)	62.7% White, 18.8% Black, 8.9% American Indian, 6.6% Hispanic, 3.0% Other	3 <sup>rd</sup> and 4 <sup>th</sup>	<p>Please note: The intervention was 2 years, but by using a repeated cross- sectional design, outcomes were tracked for the same places rather than for the same individuals.</p> <p>90% of control site children (n = 112) and 91% (n = 134) of intervention site students completed both the fall and spring assessments.</p> <p>Authors examined representativeness of the data, we compared the fourth grade after-school students to demographic information reported by the schools in aggregate for all fourth graders attending during the fall semester of each year of measurement. After-school participants were similar to all fourth graders in terms of gender (50% boys and girls for both), but were more ethnically diverse with lower percentage of non-Hispanic white (after-school = 62%; School = 72%), and had a higher percentage of children with free/reduced lunch eligible status (after-school = 48%; school = 38%). Of all fourth grade students, after-school programs reached</p>



Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Foster, 2008 <sup>7</sup>	1349 (students )	104	Overall: (53.7%) Arm1: 313 (52.17) Arm2: 412 (55.01)	Overall: 11.2 (1) Arm1: 11.20 (1) Arm2: 11.13 (1)	45.6% Black, 22.4% Asian, 14.1% Hispanic, 12.4% White, 5.5% Other	4 <sup>th</sup> , 5 <sup>th</sup> , and 6 <sup>th</sup> grade	32% across the study years. Baseline BMI of entire sample was 20.9 ± 5.1 kg/m2.  40.7% of entire sample were overweight or obese.
Hatzis, 2010 <sup>8</sup>	634	520 weeks	Overall: 52.4%	NR	NR	Grade 1 Overall: (100)	Not all students receiving the intervention or control were evaluated. A total of 1046 students were randomly selected for evaluation at baseline. of those initial 1046 children, 634 participated in the re-evaluation reported on in this article (n of the group reported on in the re-evaluation: 332 girls overall; 331 intervention, 303 control).This article is one of the multiple articles from the Creten health education program study <sup>8,15,32-34</sup>
Hendy, 2011 <sup>9</sup>	382	52 weeks	Overall: 44.8%	NR	NR	1st graders Overall: 97 (.258)  2nd graders Overall: 94 (.250)  3rd graders Overall: 100 (0.266)  4th graders Overall: 91 (0.242)	Out of the 382 children in the study, 278 (72.8%) had complete records for reward and peer monitoring.  All children had complete information for exercise.
Hoelscher, 2010 <sup>10</sup>	1107	52 weeks	Overall: 583 (53.0%) Arm1: Arm2: 299 (54) Arm3: 284 (51)	Overall: 9.92 (0.51) Arm1: Arm2: 10.0 (0.71) Arm3: 9.85 (0.38)	66.0% Hispanic, 20.0% White, 14.0% Black	4th grade	
Hollar, 2010 <sup>11</sup>	1197	68 weeks	Overall: (51.0%)	Mean age: 7.8 (1.67)	68.0% Hispanic, 15.0% White, 9.0% Black, 8% Other	NR	
Hopper, 2005 <sup>12</sup>	238	86 weeks	Overall: 117 (49.0%)	Mean age=7.60	83.0% White, 5.0% Hispanic, 5.0% Asian, 5.0% American Indian, 2.0% Black	3rd grade Overall: (100)	
Kriemler, 2010 <sup>13</sup>	502	47 weeks	Overall: 257 (51.0%) Arm1: 102 (49.8)	6.9 and 11.1	NR	1 <sup>st</sup> Grade Overall: 222 (44.2) Arm 1: 91 (44.4)	For questions #88,89,95, and 96, I put in column percentages not row percentages. For example, in the intervention group, 44.1% of the students are in the 1st

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
			Arm2:155 (52.2)			Arm 2: 131 (44.1)  5 <sup>th</sup> Grade Overall: 280 (55.8) Arm 1: 114 (55.6) Arm 2: 166 (55.9)	grade and 55.9% of the students are in the 5th grade.  Children with a baseline assessment but no follow-up assessment did not differ from the remaining children in terms of age, sex, and the primary and secondary outcome variables at baseline.
Lionis, 1991 <sup>14</sup>	171	39	Overall: (51.0%)	13-14NR	NR	NR	
Manios, 1998 <sup>15</sup>	962	156 weeks	Overall: 47.0%	NR	NR	Grade 1	This article is one of the multiple articles from the Creten health education program study <sup>8,15,32-34</sup>
Marcus, 2009 <sup>16</sup>	3135	208 weeks  At termination of the intervention: 123 and 188 children (11%) randomized to control and intervention schools, respectively, had participated for the full duration (208 weeks) of the intervention; 301 and 376 children (24%) participated for 3 years; 378 and 457 children (29%) participat	Overall: (49.0%)	Overall: 7.5 Range: 6-10 Arm1: 7.5 (1.3) Arm2: 7.4 (1.3)	NR	Grades 1- 4	The proportion of parents categorized as immigrants varied between 5 and 10% (range) in both intervention and control schools.  The proportion of children living with two parents varied between 63 and 77% in intervention and between 63 and 80% in control schools, low-income households between 8 and 22% in intervention and between 7 and 22% in control schools and parents reporting an academic level of education (higher than upper secondary school) between 23 and 46% in intervention and between 26 and 46% in control schools.

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
		ed during 2 years; and an additional 498 and 517 (36%) participated in the study for 1 year.					
Mihas, 2010 <sup>17</sup>	191	52 weeks	49% Arm1: 43 Arm2: 50	Mean age=13.2l Range: 12-13 Arm1:13.3 (0.9) Arm2:13.1 (0.8)	NR	7 <sup>th</sup> Grade Overall: (100)	Value for baseline 'N' here is for individuals who participated until the 52-week follow-up  218 were randomized at baseline.  105 assigned to control, 108 to intervention.  101 and 107 subjects at 2.1 week follow-up in Arm 1 vs. Arm 2
Nader, 1999 <sup>18</sup>	3714	156	48.0%	NR	69.0% White, 14.0% Hispanic, 13.0% Black, 4% Other	Grade 3	
Robinson, 1999 <sup>19</sup>	198	26 weeks	46.6%NR	[9-11]	NR	3,4	
Schetzina, 2009 <sup>20</sup>	114	78 weeks	53.0% Arm1: Arm2: 60 (53)	Mean age=9.0 Arm1: Arm2: 9 (0.60) Range: 7-10	94.0% White, 3.0% Black, 3.0% Other	3 <sup>rd</sup> Grade Arm 1: Arm 2: (46)  4th Arm 1: Arm 2: (54)	
Shofan, 2011 <sup>21</sup>	118	104 weeks	46.6%	[9-11]	NR	Grade 4,5, and 6	
Simon, 2008 <sup>22</sup>	954	208 weeks	50% Arm1: (47.4) Arm2: (52.6)	Overall: 11.6 (0.6) Arm1:11.7 (0.7) Arm2:11.6 (0.6)	NR	6th grade Overall: (100) Arm 1: (100) Arm 2: (100)	

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Simonetti D'Arca, 1986 <sup>23</sup>	1321	52	NR	[3-9]	NR	NR	
Speroni, 2007 <sup>24</sup>	185	24 weeks	Overall: 50.3% Arm1: 45 (57) Arm2: 48 (44) A higher percentage of girls were enrolled in the KLF group than the contrast group (57% vs. 44%, p < .05)	Mean age=9.3 Arm1: mean: 9.2 Arm2: mean: 9.4	78.3% White, 21.7% Hispanic	Grade 2 Arm 1: (33) Arm 2:  Grade 4 Arm 1: Arm 2: (29)  The majority of students (29%) enrolled in the KLF group were in Grade 4, whereas the majority (33%) of the contrast group were in Grade 2. Don't know about other grades, and the difference was not reported to be significant.	At baseline, there is a difference in levels of obesity between the two groups (61% of intervention participants are overweight or obese compared to 16% in the control group).
Trevino, 2004 <sup>25</sup>	1419	34 weeks	49.5% Arm1: (49) Arm2: (50)	Mean age=9.8 Arm1: 9.77 (0.49) Arm2: 9.79 (0.53)	80.0% Mexican American	4 <sup>th</sup> grade Overall: (100)	
Story, 2012 <sup>26</sup>	454	80 weeks	NR	Age differs by Group: Investigators reported age separately for boy and girls and by intervention arm. Arm1 Boys mean age 5.80 (0.51) Arm1 Girls mean age 5.77(0.49)  Arm2 Boys mean age 5.87(0.54) Arm2 Girls mean age 5.76(0.47)	NR	Grade: Kindergarten Overall: 454 (100)	
Brandstetter, 2012 <sup>27</sup>	1119	52 weeks	Arm1:47.8 Arm2:44.8	Arm1:7.53(0.42) Arm2:7.61(0.42)	NR	Grade: second grade Overall: 1119 (100)	
Llargues, 2011 <sup>28</sup>	509	76 weeks	Arm1:45.6 Arm2:46.3	Overall: 6.03(0.3)	NR	Reported Grade:1 Overall: (100)	704 children enrolled, baseline data for 509, 509 analyzed.

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Lloyd, 2012 <sup>29</sup>	202	72-96 weeks	Overall:(50) Arm1:(50) Arm2:(50)	Overall: 9.69(.3) Arm1:9.69(.3) Arm2:9.69(.3)	NR	NR	There was a higher percentage of body fat in the control group.
Williamson, 2012 <sup>30</sup>	2060	121 weeks	Overall:58.5 Arm1:60 Arm2:58.8 Arm3:57.2	Overall:10.5(1.2) Arm1:10.6(1.2) Arm2:10.5(1.2) Arm3:10.5(1.2)	White, Non-Hispanic Overall:650 (31.6) Arm1:157 (26.8) Arm2:264(37) Arm3:229(30.1)  Black, Non-Hispanic Overall:1410 (68.4) Arm1:430 (73.2) Arm2:449 (63) Arm3:531 (69.9)	NR	
Siegrist, 2011 <sup>31</sup>	724	52 weeks	Overall:48.3	Overall: 8.4 (0.7)	NR	NR	

BMI = Body Mass Index; Kg/m<sup>2</sup> = kilogram per meter squared; KLF = Kids Living Fit; N = Sample Size; NR = Not Reported; SD = Standard Deviation

**Evidence Table 9. Description of the interventions used in school settings with a home component**

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
Burke, 1998 <sup>1</sup>	2	WASPAN program only  Length of intervention, weeks: NR  Setting: School: Classroom lessons on physical activity and nutrition; physical activity sessions Home: Home-based nutritional program for children and their families.	Aimed to improve children's diets by prompting families to review their diets, reducing consumption of fat, sugar, and salt, increasing fiber intake, and creating links between home and school for health promotion. The nutrition program is built around four comic books in which two space creatures must discover the dietary habits of humans. It includes a Teachers' Handbook, Home-based Mission Booklet, Class Activities		The WASPAN physical education program consisted of six classroom lessons to establish a rationale plus physical activity sessions (see below)  Target: Child  Delivery: Teacher  Duration: Four fitness sessions a week Other: Actual duration and frequency: Overall, 37% of sessions lasted 15 minutes, 55% lasted 20minutes and 8% lasted 25 minutes with three sessions per week in 24%, 4 in42%, and 5 in 34%.	Innovative 20 minute fitness sessions daily by means of small group activities that allowed for the individual fitness levels and provided a range of options by means of progression through graded activities.  Target: Child  Delivery: Teacher  Duration: 4 sessions per week Other: Actual duration and frequency: 37% of sessions lasted 15 minutes, 55% lasted 20 minutes and 8% lasted 25 minutes with three sessions per week in 24%, 4 in 42%, and 5 in 34%.		Other: incentives/ motivations  Target: Child  Delivery: Researcher  Duration: Awards for each girl based on Kwanzaa principles; videotaped feedback allowing girls to teach each other and choreograph routines; opportunities for participant choice and control; and performances at public events.	The control group health education consisted of state-of-the-art, culturally tailored, authoritative, information based health education on nutrition, physical activity, and reducing cardiovascular and cancer risk. It included 24 monthly newsletters for the girls ("Felicia's Healthy News Flash") and their parents/guardians ("Stanford GEMS Health Report") and quarterly community center health lectures ("Family Fun Nights"). The researchers used the same monitoring and incentive schedules included in the experimental treatment condition.

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/envi- ronmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			Booklet, Incentives, and a Recipe Booklet that presents recipes written for children by children. Home- based Missions and Class Activities are combined in activities such as planning a week's grocery shopping on the basis of advertised prices and in learning strategies to resist peer pressure. The Incentives Booklet includes a progress chart, stickers, and a completion certificate to encourage participation from children and parents.						

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			Target: Child Family  Delivery: Teacher  Duration: Duration (e.g., length of educational or counseling sessions): Aim was 1 hour per week Other: Actual duration: 45 to 50 minutes /week in 21%, 60 minutes in 73%, and 90 to 105 minutes in 5%.						
	3	WASPAN plus physical education enrichment program (PEEP)  Length of intervention, weeks: NR  Setting: School:	Aimed to improve children's diets by prompting families to review their diets, reducing consumption of fat, sugar, and salt, increasing fiber intake, and creating links between home		The WASPAN physical education program consisted of six classroom lessons to establish a rationale and activity sessions (below).  In addition to standard WASPAN program, Children kept regular, but not continuous, 7-day	Innovative 20 minute fitness sessions daily by means of small group activities that allowed for the individual fitness levels and provided a range of options by means of progression through graded activities.  Target: Child  Delivery: Teacher			



Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		Classroom nutrition and physical activity lessons; physical education enrichment activities; physical fitness sessions Home: Home-based nutritional program for children and family.	and school for health promotion. The nutrition program is built around four comic books in which two space creatures must discover the dietary habits of humans. It includes a Teachers' Handbook, Home-based Mission Booklet, Class Activities Booklet, Incentives, and a Recipe Booklet that presents recipes written for children by children. Home-based Missions and Class Activities are combined in activities such as planning a week's grocery shopping on the		physical activity diaries, which were used by teachers to identify preferred activities and ways these might be increased in duration or frequency. Teachers and students worked together to establish goals and decide on how these might be attained. Targets were 10% to 30% above the current level and encompassed both duration and intensity of physical activity. Parents were asked to monitor completion of the diaries and to encourage increased levels of physical activity.  Target: Child Family  Delivery: Teacher  Duration: Four fitness sessions a week Other: Actual duration	Duration: Duration (e.g., time in minutes/ session) Aim: 4 sessions per week Other: Actual duration and frequency: 37% of sessions lasted 15 minutes, 55% lasted 20 minutes and 8% lasted 25 minutes with three sessions per week in 24%, 4 in 42%, and 5 in 34%.			

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/envi- ron- mental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>basis of advertised prices and in learning strategies to resist peer pressure. The Incentives Booklet includes a progress chart, stickers, and a completion certificate to encourage participation from children and parents.</p> <p>Target: Child Family</p> <p>Delivery: Teacher</p> <p>Duration: Duration (e.g., length of educational or counseling sessions): Aim: 1 hour per week Other: Actual duration: 45 to 50</p>		<p>and frequency: Overall, 37% of sessions lasted 15 minutes, 55% lasted 20minutes and 8% lasted 25 minutes with three sessions per week in 24%, 4 in42%, and 5 in 34%.</p>				

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			minutes/week in 21%, 60 minutes in 73%, and 90 to 105 minutes in 5%.						
Caballero , 2003 <sup>2</sup>	2	<p>Pathways intervention</p> <p>Length of intervention, weeks: 12 weeks</p> <p>Setting: School: Classroom curriculum Home: Family involvement</p>	<p>Classroom curriculum; Promote healthful eating behaviors and increased physical activity, Integrate social learning constructs with American Indian traditions.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: Duration (e.g., length of educational or counseling sessions): 45 minutes Frequency (e.g., number of sessions per week): twice weekly</p>	<p>Pathways guidelines for food-service personnel; Regular visit by Pathways nutritionist to support and monitor school-lunch preparation, Reduce percentage of energy from fat to &lt;30%. Introduce dietary practices aimed at increasing the use of lower-fat foods and fruit and vegetables</p> <p>Target: Child Educator Other: food-service personnel</p> <p>Delivery: Researcher</p> <p>Duration: Change in intake (e.g., increased fruit and vegetable intake; decrease fat intake): Reduce percentage</p>	<p>Physical education; to Increase energy expenditure, Encourage moderate-to-high amounts of physical activity in all children, Promote practice of health-related physical activity during and after school.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 30 minutes Frequency (e.g., number of sessions per week): 3 sessions per week</p>		Other: Family		

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
				of energy from fat to <30%.					
Coleman, 2005 <sup>3</sup>	2	<p>El Paso CATCH</p> <p>Length of intervention, weeks: Not clear</p> <p>Setting: School: classroom and school wide Physical education and cafeteria component Home: Plus Home Team component</p>	<p>Classroom curriculum component (Eat Smart?) (described in detail elsewhere)</p> <p>Target: Child</p> <p>Delivery: Teacher</p>	<p>Cafeteria component (described in detail elsewhere)</p> <p>Target: Child</p> <p>Delivery: Other: Food service staff (trained by the members of the original CATCH program)</p>	<p>Classroom curriculum component (described in detail elsewhere)</p> <p>Target: Child</p> <p>Delivery: Teacher</p>	<p>Physical Education component(described in detail elsewhere)</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Other: PE teachers</p>	<p>Other: Home Team component (described in detail elsewhere)</p>		
Danielzik , 2007 <sup>4</sup>	2	<p>Nutrition and activity curriculum</p> <p>Length of intervention, weeks: 2-3 weeks</p> <p>Setting: School: Nutrition and activity curriculum</p>	<p>Behavioral and educational messages; eat fruit and vegetable every day and reduce intake of high-fat foods. Messages were conveyed by use of nutrition fairy tales, interactive games as well</p>		<p>Behavioral and educational messages; keep active at least 1 h/d, and decrease television consumption to 1 h/d. After each unit, running games were offered for 20 min on the school yard.</p> <p>Target: Child</p>		<p>Other: parental involvement and training of teachers</p>		

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>as by preparing a healthy breakfast.</p> <p>Target: Child Parent/Caregiver Educator</p> <p>Delivery: Other: Skilled nutritionist</p> <p>Duration: 6 hours</p>		<p>Parent/Caregiver Educator</p> <p>Delivery: Teacher</p> <p>Duration: 6 hours</p>				
Dzewaltowski, 2010 <sup>6</sup>	2	<p>HOP'N after school</p> <p>Length of intervention, weeks:</p> <p>Setting: School</p>	<p>Targeting Educators: To assist the program staff, the research team provided a list of healthy snack ideas and content expertise for after-school snacks.</p> <p>Targeting children: HOP'N Club was a weekly social-cognitive-theory based curriculum. The</p>	<p>Every day, staff had the goal to work with their school's food service to provide FV with every snack.</p> <p>Target: Educator</p> <p>Delivery: Researcher</p>	<p>Targeting children: HOP'N Club was a weekly social-cognitive-theory based curriculum. The curriculum was organized in a notebook form with weekly modules that included learning objectives, behavior change strategy goals, and implementation procedures and scripts. The HOP'N Club child behavioral goals were: Be physically active every day (30</p>	<p>Every day, staff had the goal to implement 30 minutes of organized PA following the CATCH Kids Club PA principles. The project provided the CATCH Kids Club curriculum box and PA equipment.</p> <p>Target: Educator</p> <p>Delivery: Researcher</p>	<p>Target: Teacher</p> <p>Delivery: Through the HOP'N Club curriculum, children had the goal to cut back on TV and video games (no more than 2 hours a day; remove TV from the bedroom.</p> <p>Other: Change in home environment.</p>		

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>curriculum was organized in a notebook form with weekly modules that included learning objectives, behavior change strategy goals, and implementation procedures and scripts. The HOP'N Club child behavioral goals were: eat FV at every meal or snack; drink less soda and juice drinks (drink water, no more than 1 can of soda or small cup daily);</p> <p>Target: Child Educator</p> <p>Delivery: Researcher Teacher</p>		<p>minutes after-school, 60 minutes daily).</p> <p>Target: Child</p> <p>Delivery: Teacher</p>				
Foster, 2008 <sup>7</sup>	2	School Nutrition Policy Initiative	Classroom-based nutrition education.	Foods sold were changed to meet the following nutritional	Education demonstrating how physical activity is	Student participated in a 2-1-5 challenge. (<2 hours of TV and video	Target: Researcher Delivery: Student participated in a 2-	Goal setting  Target: Child	

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		(SNPI)  Length of intervention, weeks: NR  Setting: School: (1) school self-assessment; (2) nutrition education; (3) nutrition policy; (4) social marketing; and (5) parent outreach. Home: home meetings with family members  Policy: Yes	The SNPI used several social marketing techniques to increase meal participation and consumption of healthy snack and beverage items. Students who purchased healthy snacks and beverages or who brought in snack items that met the nutritional standards from home or local stores received raffle tickets.  Student participated in a 2-1-5 challenge. (<2 hours of TV and video games per day; >1 hour of physical activity per day; >5 fruits and vegetables per	standards:"all of the beverages were limited to 100% juice (recommended 6-oz serving size), water (no portion limits), and low-fat milk (recommended 8-oz serving size). Snack standards allowed <7 g of total fat, 2 g of saturated fat, 360 mg of sodium, and 15 g of sugar per serving."  Reduction of unhealthy foods sold at parent fundraisers.  Target: Child Parent/Caregiver  Delivery: Researcher Other: Schools under the direction of the district's Food Service Division	tied to personal behavior, individual health, and the environment.  Schools assessed their environments and completed ratings on healthy eating and physical activity.  School staff in the intervention schools completed training on nutrition and physical activity.  Target: Child Other: schools; staff  Delivery: Researcher  Duration: provided 50 hours of education per student per school year  Comment: staff received 10 hours per year of training.	games per day; >1 hour of physical activity per day; >5 fruits and vegetables per day).  Target: Child  Delivery: Researcher	1-5 challenge which included <2 hours of TV and video games per day.	Delivery: Teacher  Duration: Booster sessions were introduced to reach a sustained increase in water consumption by giving quantitative targets and feedback.	

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/envi- ronmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			day).  Parents were given nutritional education during parent-school meetings and discouraged to send sweets to teachers during holidays.  Schools assessed their environments and completed ratings on healthy eating and physical activity.  School staff in the intervention schools completed training on nutrition and physical activity.  Target: Child, Parent/ Caregiver, Other: schools; staff						



Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>Delivery: Researcher, Teacher</p> <p>Duration: 50 hours per student per school year of education was provided</p> <p>Comment: staff received 10 hours per year of training.</p>						
Hatzis, 2010 <sup>8</sup>	2	<p>intervention</p> <p>Length of intervention, weeks:</p> <p>Setting: School: classroom-based instruction Home: parents attended educational sessions as well.</p>	<p>NR here in detail; however, program was based on the "Know Your Body" education material with major modifications to the Mediterranean diet of Crete and the orthodox Christian church fasting rituals. Students were educated between grades</p>		<p>NR here in detail; however, program was based on the "Know Your Body" education material with major modifications to the Mediterranean diet of Crete and the orthodox Christian church fasting rituals. Students were educated between grades 1-6 according to intervention principles about physical activity and fitness among other health topics</p>		Other: Other health topics included alcohol overconsumption, smoking and accident prevention and generally health promotion		

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/envi- ronmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			1-6 according to intervention principles about dietary issues among other health topics  Target: Child  Delivery: Teacher  Duration: Duration (e.g., length of educational or counseling sessions): health and nutritional components incorporated 13- 17 hours of teaching over the academic year  Comment: Reference for the Know Your Body: Williams et al 1977 Primary prevention of chronic disease		Target: Child  Delivery: Teacher  Duration: health and nutritional components incorporated 13-17 hours of teaching over the academic year				

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environ- mental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>beginning in childhood. The "know your body" program: design of study. Prev Med 6, 344-357.</p> <p>Walter and Wynder 1989 The development, implementation, evaluation and future directions of chronic disease prevention program for children: the "Know Your Body" studies. Prev Med 18, 59-71.</p> <p>Arbeit et al 1992 The Heart Smart cardiovascular school health promotion: behavior correlates of risk factor change. Prev</p>						

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			Med 21, 18-32.						
Hendy, 2011 <sup>9</sup>	2	<p>KCP group (LIONS)- received stars for 3 good health behaviors (1/8 cup FV; choosing low-fat and low-sugar drink and having 5000 exercise steps)</p> <p>Length of intervention, weeks:</p> <p>Setting: School: Earned stars during lunch for good health behaviors Home: Earned stars if parents reported behaviors during 5 dinner meals at home per week.</p>	<p>Receive a star for eating 1/8 cup FV ("the size of a ping pong ball") first during their meal (FVFIRST), choosing a low-fat and low sugar healthy drink (HDRINK).</p> <p>Could earn extra stores if a parent reported behavior during dinner meals at home.</p> <p>Target: Child</p> <p>Delivery: Researcher</p>		Receive a star for having 5000 exercise steps recorded on a pedometer (EXERCISE).			<p>Other: statewide legislation to combat childhood obesity</p> <p>Target: Child Parent/Caregiver</p> <p>Comment: BMI measurement, with confidential reports to parents; removal of vending machine access for all public elementary school students; public disclosure of vending contracts; creation of a state-level advisory committee to recommend physical activity and nutrition policy changes to the board of education; and creation of school district-level advisory committees to guide local policy implementation.</p>	
Hoelsche r, 2010 <sup>10</sup>	2	CATCH BP intervention	To increase fruit and vegetable		To increase moderate-to-vigorous		Target: Researcher		

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		<p>Length of intervention, weeks: 52 weeks</p> <p>Setting: School: K-5 classroom curricula and a Physical education program, a child nutrition services component Home: family involvement</p> <p>Policy: Yes</p>	<p>consumption; to decrease sugar-sweetened beverage consumption; to increase consumption of CATCH GO foods; and to encourage healthy meal patterns, such as breakfast consumption.</p> <p>Target: Child</p> <p>Delivery: Researcher</p>		<p>Physical activity in students, in school PE and activity breaks as well as at home.</p> <p>Target: Child</p> <p>Delivery: Researcher</p>		<p>Delivery: To decrease sedentary activity, specifically television viewing.</p> <p>Other: School involvement</p>		
	3	<p>CATCH BPC intervention</p> <p>Length of intervention, weeks: 52 weeks</p> <p>Setting: School: K-5 classroom curricula and a Physical education program, a</p>	<p>To increase fruit and vegetable consumption; to decrease sugar-sweetened beverage consumption; to increase consumption of CATCH GO foods; and to encourage healthy meal patterns, such as breakfast</p>	<p>Menus implemented by schools included: providing opportunities for students to have a taste of healthful foods; implementation of school gardening programs; implementation of PA breaks during class time; and implementation of after-school PA</p>	<p>To increase moderate-to-vigorous Physical activity in students, in school PE and activity breaks as well as at home.</p> <p>Target: Child</p> <p>Delivery: Researcher</p>		<p>Target: Researcher</p> <p>Delivery: To decrease sedentary activity, specifically television viewing.</p> <p>Other: School involvement</p>		

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		child nutrition services component Home: family involvement Community or environment-level: community action team	consumption.  Target: Child  Delivery: Researcher	programs.  Target: Child  Delivery: Researcher Other: CATCH community action team					
Hollar, 2010 <sup>11</sup>	2	HOPS intervention  Length of intervention, weeks: 68 weeks  Setting: School: School provided diet, classroom curricula, and physical activity during school day.  Policy: Yes	Nutrition educational activities; a multimedia set of materials highlighting especially nutrient-dense foods and healthful lifestyle habits were sent to intervention schools, including Foods of the Month (FoM) posters, tips for FoM tastings, FoM parent newsletter inserts, FoM activity packets, healthful lifestyle	Consisted of rigorous modifications to school-provided breakfasts, lunches, and extended lunches, extended-day snacks in all intervention schools. Menus were modified to include more high-fiber items, such as whole grains, fresh fruits, and vegetables; fewer items with high-glycemic effects, such as high-sugar cereals and processed flour bakery goods; and lower amounts of total, saturated, and trans fats, thus modeling the	The program included curricula on physical activity and other school-based wellness projects to teach children, their parents, teachers, and staff about good nutrition and the benefits of daily physical activity. The primary goal was to improve the health and academic achievement of children in a replicable and sustainable manner.  Target: Child  Delivery: Teacher	Schools were encouraged to implement daily physical activity in the classroom during regular teaching time. These desk side physical activities are matched with core academic areas such as spelling and math to encourage adoption of daily physical activity in addition to recess and physical education time. Schools also were asked to implement structured physical activity during recess time, as much as possible. Other physical activities, such as walking clubs, encouraged children and adults to walk before the start of each school day.			

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			handouts, school gardening instructions, and other materials aligned with special programming such as National Heart Health Month, National Nutrition Month, and National School Breakfast and Lunch Weeks.  Target: Child  Delivery: Other: HOPS staff (including an RD), elementary school education experts and USDA Food and nutrition staff.  Duration: monthly	nutrition messages being shared in classrooms reflecting the core tenets of the Dietary Guidelines for Americans, and in compliance with USDA NSLP guidelines.  Target: Child  Delivery: Other: Registered dietitian (RD)		Target: Child  Delivery: Teacher  Duration: 10- to 15-minute Frequency: daily			
Hopper, 2005 <sup>12</sup>	2	"Family fitness"	Classroom nutrition education		Physical education instruction emphasizing the		Other: home program		

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		<p>Length of intervention, weeks: 20 weeks</p> <p>Setting: School: Classroom lessons on nutrition and exercise Home: home activities for parents and children to complete</p>	<p>emphasizing impact of nutrition on health, reading food labels, hands on activities, games, group discussion and role playing to encourage use of healthy foods. Children were also taught how to discuss nutritional topics at home with their parents and how to improve eating habits within the family.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 30 minutes Frequency: two lessons per week.</p>		<p>physical activity and fitness objectives specified in healthy people 2000.Lessons included cooperative activities and games with aerobic activity and other activities as walking and bicycling with parents.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 30 minutes Frequency: three sessions per week</p>				
Jago,	2	HEALTHY	to consume a	To consume	to engage in	to engage in increased			



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2011 <sup>35</sup>		<p>intervention</p> <p>Length of intervention, weeks: NR</p> <p>Setting: School: focused on changes in school food quality, teacher-facilitated learning activities and a revised PE curriculum</p>	<p>healthier diet</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Other: school</p> <p>Duration: Five FLASH modules were implemented over five semesters. Each module delivered on a weekly basis</p> <p>Comment: A program of peer-led, teacher-facilitated learning activities known as FLASH (Fun Learning Activities for Student Health) was introduced to foster self-awareness, knowledge, decision-making skills, and peer</p>	<p>healthier diet</p> <p>Target: Child</p> <p>Delivery: School</p> <p>Comment: Change in the total school food environment, with the nutritional quality of food and beverages provided during school breakfast and lunch periods improved.</p>	<p>increased physical activity</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Other: school</p> <p>Comment: A revised, more active, physical education (PE) curriculum was adopted. The PE curriculum was designed to facilitate higher student participation in the lessons and spend more time engaged in moderate to vigorous physical activity (MVPA) during PE lessons.</p> <p>A social marketing campaign that had a different theme for each semester of the intervention was also conducted with one of the themes encouraging physical activity instead of sedentary time. Theme was</p>	<p>physical activity</p> <p>Target: Child</p> <p>Delivery: Researcher</p> <p>Other: teacher assistant</p> <p>Comment: Schools also received around \$10,000 of equipment and a teacher assistant to facilitate small group activities that were intended to increase activity time during the sessions.</p>			

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			<p>involvement for health behavior change.</p> <p>A social marketing campaign that had a different theme for each semester of the intervention was also conducted different themes including water consumption, high-quality versus low quality food, energy balance, and life choices. Each theme was supported by branding, posters, and messaging that was prominently displayed and reinforced across the school.</p>		supported by branding, posters, and messaging that was prominently displayed and reinforced across the school.				
Kriemler, 2010 <sup>13</sup>	2	<p>KISS</p> <p>Length of intervention, weeks: 39</p>				The three compulsory weekly physical education lessons (45 minutes each) given by the usual classroom			The total 110 minute intervention consisted of 30 minutes homework/healthy snack time and 80 minutes of PA

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		Setting: School: a school based stringent physical activity program Home: “The children received daily physical activity homework of about 10 minutes’ duration prepared by the physical education teachers. This included aerobic, strength, or motor skill tasks such as brushing their teeth while standing on one leg, hopping up and down the stairs, rope jumping, or comparable				teachers (according to the specified curriculum), were supplemented with two additional weekly lessons (45 minutes each), which were taught mostly outdoors by physical education teachers. In addition, three to five short activity breaks (two to five minutes each) during academic lessons—comprising motor skill tasks such as jumping or balancing on one leg, power games, or coordinative tasks—were introduced every day. The children received daily physical activity homework of about 10 minutes’ duration prepared by the physical education teachers. This included aerobic, strength, or motor skill tasks such as brushing their teeth while standing on one leg, hopping up and down the stairs, rope jumping, or comparable activities.  Target: Child			

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		activities.				Delivery: Teacher Other: PE teacher  Duration: 45 minutes Frequency: 5 per week.			
Lionis, 1991 <sup>14</sup>	2	Health Education Group  Length of intervention, weeks: 39  Setting: School: health education curriculum	Educational curriculum focused on nutrition, physical fitness and prevention of cigarette smoking.  Target: Child  Delivery: Teacher Other: health team consisted of 1 doctor, 2 nurses and 2 social workers  Duration: 2 hour/session Frequency:10 sessions/acade mic year  Comment: Teachers' guidebook and students'						

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			workbook entitled "Know Your Body" was the main educational aids. The main aim of the model was to enable students to recognize risk factors and resist the negative influences of the surrounding environment. Students' progress was monitored using a standardized questionnaire at the end of each session to see whether they understood the concepts. Other teaching materials including worksheets, videotapes, posters and health passports were available.						

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			Health passports contained results of the medical examination for each student.						
Manios, 1998 <sup>15</sup>	2	Intervention  Length of intervention, weeks: 156  Setting: School: health education plus PA components.	Health and nutrition education  Target: Child Parent/Caregiver  Delivery: Teacher  Duration: twice a year for parents Other: 13-17 hrs of classroom material annually for children  Comment: provide children with workbooks and design teacher aids; provide parents screening results and		Theoretical component of physical fitness and activity  Target: Child Parent/Caregiver  Delivery: PE instructors  Duration: twice a year for parents Other: 4-6 h of classroom material per year  Comment: Theory comprised of two parts: 1) that which follows screening and explains the tests and results, and 2)that which concentrates on intervention to improve fitness results through behavioral changes.	Practical component of physical fitness and activity  Target: Child  Delivery: PE instructors  Duration: 45 min/session Frequency: two sessions per week  Comment: Practical aspects were delivered in the playground. Fitness-oriented exercise sessions were enjoyable, of moderate intensity and involved total classroom participation. All sessions, at the beginning, consisted of a short warm up period and stretching exercises. In the remainder of the time pupils were engaged in activities such as skipping, fitness			

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			presentations on the importance of topics relevant to children's dietary and exercise habits		Regarding the first part, explanations were offered in a simple, friendly way about the importance of the fitness and anthropometric tests in relation to being strong. Regarding the second part, self-improvement was emphasized to allow for success on a regular basis, and progression of skills and fitness scores identified for each grade to help ensure continual fitness development from year to year.	stations and several aerobic group games. Less emphasis was placed on competition and winning and rewards were given for all levels of effort and ability.			
Marcus, 2009 <sup>16</sup>	2	Diet, physical activity (PA) and awareness  Length of intervention, weeks: Maximum: 208  Setting: School: Focus was to change the school environment,		Dietary intervention: school lunch and afternoon snack. The teachers were instructed to encourage the children to increase the intake of vegetables during the school lunch. To facilitate this, all intervention schools had agreed to offer a		Intervention aimed at increasing the amount of PA by 30 min per child per day.  Target: Child  Delivery: Teacher  Duration: 30 min/PA sessions daily PA was integrated into the regular school curriculum Frequency: Daily PA	Target: Teacher Other: After school staff//Delivery: Children were not allowed to bring toys that might increase sedentary behavior, such as hand held computer games, to schools and after school care centers. The maximum time		

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		including school lunches, afternoon snacks, after school care activities and sports days. Home: When celebrating birthdays, parents were asked not to provide these products at schools and after school care centers. Furthermore, parents of the children in the intervention schools were instructed not to supply sweetened drinks, sweets and other unhealthy products in the packed lunch during school excursions and sports days.		variety of vegetables, and the food was arranged so that the children first served themselves vegetables and thereafter the main course. White bread was substituted with whole-grain bread or similar products including a high amount of dietary fibers. The sugar content in the school lunches and in the afternoon snacks was reduced by strategies such as replacing fruit yogurt with plain yogurt and eliminating fruit juices, soft drinks, lemonades and desserts. Whole-fat (3% fat content) or medium-fat (1.5% fat content) milk was substituted by skimmed milk (0.5% fat) and low-fat butter,		sessions.	spent playing computer games at the after school care centers was restricted to 30 min per child per day.  Comment: Steps taken to increase awareness of the intervention. A STOPP newsletter distributed to parents and school staff. Also, research staff had meetings with the school personnel. School nurses received education in obesity-related problems.		



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				cheese and yoghurt were provided. Sandwich ingredients were required to be low fat. Other aspects on food intake: Intervention schools were encouraged to eliminate sweets, sweet buns and ice cream in association with festivities. When celebrating birthdays, parents were asked not to provide these products at schools and after school care centers. Furthermore, parents of the children in the intervention schools were instructed not to supply sweetened drinks, sweets and other unhealthy products in the packed lunch during school excursions					

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				and sports days.  Target: Child Parent/Caregiver Educator  Delivery: The school Change in intake (e.g., increased fruit and vegetable intake; decrease fat intake): Increase intake of vegetables; whole fat and low fat milk was substituted with skimmed milk and low-fat butter, cheese and yoghurt Change in calorie intake: Sugar content was reduced by replacing fruit yoghurt with plain yoghurt and eliminating fruit juices, soft drinks, lemonades, and desserts. Other: Intervention schools encourage eliminating sweets, buns, and ice cream associated with festivities. Parents were instructed not					

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				to pack sweet drinks or other sweets for school trips or sport days.					
Mihas, 2010 <sup>17</sup>	2	<p>Health and Nutrition Education</p> <p>Length of intervention, weeks: 12</p> <p>Setting: School</p>	<p>Each child was supplied with multi-component workbooks that covered mainly dietary issues, but also dental health hygiene and consumption attitudes. These books were aimed at improving children's diet and nutrition knowledge</p> <p>Additionally; classroom modules for the children were designed to develop behavioral capability, expectations and self-efficacy for healthful eating and</p>				Goal setting		

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			healthy foods selection. Learning activities for the classroom modules were designed to influence expectancies that placed an important value on achieving these behaviors. Several motivational methods and strategies were used for increasing skills and self-efficacy, achieving better self-monitoring, changing attitudes and beliefs and changing social influence. (Further information on these motivational methods and strategies is						

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			<p>provided in the Comment box). Cues and reinforcing messages in the form of posters and displays were provided in the classroom.</p> <p>Parental involvement: (i) Meetings held with parents where they were given a file containing their child's screening results. During the meetings, presentations on the importance of topics relevant to the dietary habits of children were issued to improve the health profile of the children and prevent the development of</p>						

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			<p>chronic diseases in the future. In addition, a special comment was made for each obese child, although his/her identity was not revealed for privacy reasons.</p> <p>(ii) Parents were also encouraged to modify their dietary habits as well as those of their children. These meetings played an extra role: to facilitate parents' participation and provide them with the opportunity to resolve any queries about their children's health.</p> <p>Target: Child</p>						

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			Parent/Caregive r  Delivery: Teacher  Duration: 12 hours of classroom material during 12 weeks for children; 2 meetings with parents, following the baseline examinations  Comment: Several motivational methods and strategies were used for increasing skills and self-efficacy (i.e. modeling, guided practice, enactment), achieving better self-monitoring (i.e. problem solving, goal setting),						

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			changing attitudes and beliefs (i.e. self reevaluation, environmental re-evaluation, arguments, modeling, direct experience) and changing social influence (i.e. modeling, mobilizing social support).						
Nader, 1999 <sup>18</sup>	2	<p>CATCH intervention</p> <p>Length of intervention, weeks: 156</p> <p>Setting: School: school-based Home: In some intervention schools, a family component.</p>	<p>NR in detail here, but article provides overview: "the CATCH intervention targeted consuming foods low in fat, saturated fat and sodium via a multicomponent program that included school environmental changes, a 3-year sequential classroom curriculum, and in some</p>	<p>NR in detail here, but article provides overview: "the CATCH intervention targeted consuming foods low in fat, saturated fat and sodium via a multicomponent program that included school environmental changes, a 3-year sequential classroom curriculum, and in some intervention schools, a family component.</p> <p>Target: Child</p>	<p>NR in detail here, but article provides overview: "the CATCH intervention targeted increasing levels of physical activity via a multicomponent program that included school environmental changes, a 3-year sequential classroom curriculum, and in some intervention schools, a family component.</p> <p>Target: Child</p> <p>Comment: as above, see reference for</p>	<p>NR in detail here, but article provides overview: "the CATCH intervention targeted increasing levels of physical activity via a multicomponent program that included school environmental changes, a 3-year sequential classroom curriculum, and in some intervention schools, a family component.</p> <p>Target: Child</p> <p>Comment: as above, see reference for intervention design: Perry CL, Stone EJ, Parcel GS, et al. (1990) School-based</p>	Other: avoiding smoking initiation		



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			<p>intervention schools, a family component.</p> <p>Target: Child</p> <p>Duration: 3 years</p> <p>Comment: see reference for intervention design: Perry CL, Stone EJ, Parcel GS, et al. (1990) School-based cardiovascular health promotion: the child and adolescent trial for cardiovascular health (CATCH). J Sch Health 60:406-13.</p>	<p>Comment: as above, see reference for intervention design: Perry CL, Stone EJ, Parcel GS, et al. (1990) School-based cardiovascular health promotion: the child and adolescent trial for cardiovascular health (CATCH). J Sch Health 60:406-13.</p>	<p>intervention design: Perry CL, Stone EJ, Parcel GS, et al. (1990) School-based cardiovascular health promotion: the child and adolescent trial for cardiovascular health (CATCH). J Sch Health 60:406-13.</p>	<p>cardiovascular health promotion: the child and adolescent trial for cardiovascular health (CATCH). J Sch Health 60:406-13.</p>			
Robinson , 1999 <sup>19</sup>	2	The intervention was a 6-month classroom curriculum to reduce	none	none			<p>Target: Teacher</p> <p>Delivery: 18 30-50 minute classroom-based lessons were given during</p>		

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		<p>television, videotape, and video game use.</p> <p>Length of intervention, weeks: 30 (7 months)</p> <p>Setting: School: focus in the classroom Home: Newsletters that were designed to motivate parents to help their children stay within their time budgets and that suggested strategies for limiting television, videotape, and video game use for the entire family were distributed to parents.</p>					<p>the course of the 7 month intervention. They were administered by teachers, which were trained by research staff. lessons were on the following topics, which went along with a home-based component: early lessons focused on self-monitoring and self-reporting of TV, videotapes, and video games to motivate them to reduce use; a 10-day challenge to turn off the TV, videotapes and video games completely followed; and then after this, children were encouraged to use a 7 hour per week budget for TV, videotapes, and video games. Additional lessons included: how to be selective in their viewing and</p>		

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							gaming and enlisting children to advocate for reducing media use. A parent component consisted of newsletters that were distributed to parents. These contained strategies on how to limit media use in the family and motivation for them to help their kids stay within the 7 hour budget. Each house also received an electronic TV time manager that would also work on the VCR. Families could request as many for their TVs as necessary.		
Schetzina, 2009 <sup>20</sup>	2	Winning with Wellness Pilot program  Length of intervention, weeks: 43	To promote behavior change via nutrition and health education in students and faculty and staff.	To promote healthier diet Replacement of soda with water and fat-free milk or reduced-fat milk  Target: Child	To promote an active lifestyle  Target: Child Educator  Delivery: Teacher	To promote physical activity during the school day  Target: Child Educator  Delivery: Teacher			

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		<p>Setting: School: focused on classroom instruction, school health services, and removing soda from vending machines and physical education and activity</p> <p>Home: newsletters and handouts sent home.</p>	<p>To engage parents in promoting behavior change in students.</p> <p>Target: Child Parent/Caregiver Educator</p> <p>Delivery: Teacher program staff</p> <p>Comment: The nutrition component included a series of 4 interactive Go, Slow, and Whoa lesson plans developed by an East Tennessee State University registered dietitian (RD). The Go, Slow, and Whoa program teaches students about</p>	<p>Educator</p> <p>Delivery: Teacher school</p> <p>Comment: the school administration began replacing soda in school vending machines with water and fat-free or reduced-fat milk. School guidelines were established for limiting the use of foods of low or minimal nutritive value for refreshments during classroom parties and for sale in school fundraisers. Parents were also asked to follow these guidelines when sending foods and drinks from home. Teachers were educated about avoiding the use of food as rewards and withholding physical activity as</p>	<p>Comment: 6 interactive lesson plans designed to assist teachers teach the concept of energy balance and promote physical activity in conjunction with monitoring steps using a pedometer.</p>	<p>exercise specialist</p> <p>Comment: To help promote physical activity during the school day, indoor and outdoor walking trails were established at the school by the administration through support of the Parent Teacher Organization. Teachers were also trained by an exercise specialist from the hospital to lead students in Move It Moments, which are 5-minute combinations of desk-side stretching, strengthening, and aerobic exercises.</p>			

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			how to make healthy food and beverage choices as part of a balanced eating plan. RD analyzed menus and made suggestions to the school food service coordinator about altering food preparation to decrease the fat content of items and replacing foods of low and minimal nutritive value with healthier options. During the second year of the program, program assistants from the county extension service provided in-class healthy snack preparation demonstrations using a mobile	punishment.					

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			kitchen unit at classroom teachers' request. The health education component promoted healthy eating. It included 6 interactive lesson plans that promoted small changes in eating. Counseling and psychological services were also offered to help facilitate and guide the development and implementation of the winning with wellness program. A wellness initiative for teachers and staff members included on-site lectures on health and wellness,						

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			discounted gym memberships, and free health screenings. In addition, the school administration encouraged teachers and staff to set their own goals for healthy eating and active living and organized a “biggest loser” program for teachers and staff interested in losing weight. Parents were encouraged to be present in the school cafeteria during lunch to assist students in making healthy food choices using the Go, Slow, and Whoa concept.						
Shofan, 2011 <sup>21</sup>	2	The intervention focused on	During the 2 years of the program, the			The intervention group received double the physical education hours	Other: Parent Meetings		

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		<p>increased physical education and activity together with nutritional advice to the children and their families.</p> <p>Length of intervention, weeks: 104 weeks</p> <p>Setting: School: PE and nutritional advice.</p>	<p>study group received 8 nutritional education lessons.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Directed by the Braun School of Public Health in cooperation with Ministry of Ed.</p>			<p>as compared with the control group.</p> <p>Target: Child</p> <p>Delivery: This program was overseen by the Ministry of Education's inspectorate for Physical Education</p> <p>Comment: We know that the normal PE classes were 2 45min lessons per week of medium intensity training with an estimated aerobic component of 25%, and that the study group received double the PE hours compared to the control group.</p>			
Simon, 2008 <sup>22</sup>	2	<p>Intervention</p> <p>Length of intervention, weeks: 208</p> <p>Setting: School: Education component focused on physical activity and</p>			<p>The intervention program came in addition to the standard school curriculum (which, in France, includes three 50-min physical education classes per week). The program included an educational component focusing on physical activity</p>	<p>New opportunities for physical activity were offered at lunchtime, during breaks and afterschool hours, taking into account the obstacles to being active.</p> <p>The activities, academic or less formal during breaks, were organized by physical educators without any restrictive</p>			



Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		sedentary behaviors; opportunities for physical activity were offered during school and during afterschool hours. Home: Parents were asked to support the child's physical activity.			and sedentary behaviors.  Parents and educators were encouraged to provide support to enhance the adolescents' physical activity level through regular meetings.  Target: Child Parent/Caregiver Educator  Delivery: Teacher	competitive aspect. Enjoyment of participation was highlighted to help the less confident children to develop the competences needed to adopt an active lifestyle. Sporting events and 'cycling to school' days were organized.  Target: Child  Delivery: Teacher			
Simonetti D'Arca, 1986 <sup>23</sup>	2	Multi-media action school  Length of intervention, weeks: 52  Setting: School: focused on educating staff, students and parents using media	to promote a healthier diet  Target: Child Parent/Caregiver Family Educator  Delivery: Researcher  Comment: the dissemination of rules for correct diet and nutrition via printed material					Other: within the "healthy living" focus of the program, theme 3: "Go feel good" was focused on healthy body image, self-esteem, and social responsibility. Students learned about valuing themselves and others based on who they and others are on the inside - addressed body-image, disordered eating issues (via teaching about healthy growth and development and media literacy). fitness loops were designed for all	

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			(illustrated pamphlets, memoranda, etc.), audiovisuals (short films, slides, etc.), discussion meetings with families and teachers.					levels of fitness for healthy body image development.  Target: Child  Delivery: Teacher	
	3	Written action school  Length of intervention, weeks: 52  Setting: School: focused on educating staff, students and parents using printed material only.	To promote a healthier diet  Target: Child Parent/Caregiver Family Educator  Delivery: Researcher  Comment: the dissemination of rules for correct diet and nutrition via only printed material was distributed among pupils, teachers and families.						
Speroni, 2007 <sup>24</sup>	2	KLF intervention	Dietary education			Physical fitness activities to reinforce best lifestyle	Food diary	Food diary	

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		<p>group</p> <p>Length of intervention, weeks: 12</p> <p>Setting: School: after-school exercise and diet education program.</p>	<p>presentations</p> <p>Target: Child</p> <p>Delivery: registered dietitians</p> <p>Duration: 30 minutes/session</p> <p>Frequency: 4 sessions in total</p> <p>Comment: The first addressed best choice lunch selections. The purpose of identifying a best choice lunch was to expose the participants to thinking in terms of best lifestyle choices and making choices that are based on what is nutritiously best for them instead of momentary food desires. The dieticians</p>			<p>choices, weekly exercise</p> <p>Target: Child</p> <p>Delivery: A physical fitness trainer</p> <p>Duration: 1 session/week</p> <p>Other: 8 1-hr sessions and 4 30-min sessions</p> <p>Comment: A physical fitness trainer led the participants in performing various types of physical fitness activities, such as aerobic dance, light strength training, stretching, balancing techniques, heart rate monitoring, yoga, and relaxation techniques. Best lifestyle choices were reinforced, encouraging participants to make best choices in selecting active behaviors such as running or cycling compared with being sedentary by viewing television or playing video games. The purpose of the exercise component was to help</p>		<p>Target: Child</p> <p>Children completed diaries at baseline and at the end of the trial on drinks consumed over 3 days (2 weekdays, 1 weekend).</p> <p>Comment: Diaries were done as part of outcome measures.</p>	

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/envi- ronmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>also created best choice lunch menus for children who brought their lunch from home rather than buying the school lunch.</p> <p>The second presentation the US Department of Agriculture food pyramid and serving sizes.</p> <p>The third dietary education component was interactive portion distortion presentation. Calories were described in simple terms, showing side by-side comparisons of serving sizes 20 years ago versus serving sizes</p>			<p>participants identify a variety of active behaviors they enjoyed and could conduct independently following the conclusion of the program.</p>			

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>today. Students then guessed how long it would take to walk or ride a bike to burn the extra energy found in today's larger serving sizes.</p> <p>The final dietary presentation focused on making best choices at fast-food restaurants and summarized information from the previous three presentations.</p>						
Trevino, 2004 <sup>25</sup>	2	<p>Health examination and school health program</p> <p>Length of intervention, weeks: 30 weeks</p> <p>Setting: School: health</p>	<p>Health behavior messages targeting decrease dietary saturated fat intake and increase dietary fiber intake. Bienestar school food service</p>		<p>Health behavior and physical activity class to increase physical activity in children and promote active lifestyle through 32 different physical activities.</p> <p>Target: Child</p> <p>Delivery: Teacher</p>	<p>Bienestar health club (includes an instructor's manual and a student's workbook. Bienestar family fun fiesta (includes an instructor's manual and a parent's workbook).</p> <p>Target: Child</p> <p>Delivery: Teacher</p>	<p>Goal setting</p> <p>Other: Peer leading.</p>		

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		<p>behavior messages in classroom, school cafeteria, after-school care. Home: reinforced at home and after school care.</p> <p>(includes an instructor's manual and a Cafeteria staff workbook). The school food service promotes health food knowledge amongst staff and children. Family fun fiesta.</p> <p>Target: Child</p> <p>Delivery: Teacher Other: parents, school Cafeteria staff, and after-school caretakers</p> <p>Duration: 45 minutes Frequency: Once a week, 50 sessions over 7months Other: School food service sessions- one lesson per month lasting</p>			<p>Duration: 45mins/day Frequency: 5day/week; 1day health education, 4day physical activities.</p>	<p>Other: parents, school Cafeteria staff, and after-school caretakers</p> <p>Duration: Club meeting; 1h/weekly after school. Other: parent meetings; once every other month.</p>			

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			30mins, One lesson per month; (8:15–8:45 AM) during staff break; lunch visits to persuade children are once a week.						
Story, 2012 <sup>26</sup>	2	Bright Start  Length of Intervention (weeks): 45  Setting: School: physical activity sessions, nutritional lessons Home: goal to increase health awareness and better eating habits at home through motivational interventions	Family-focused intervention promoting healthy diet, proper nutrition, Specific behavioral messages for the family included eating more fruits and vegetables, substituting water for sugar-sweetened beverages, limiting high-fat and high-sugar snacks and fast foods, drinking skim or 1% milk.  Target: Child Parent/Caregiver Family:  Delivery: Teacher, trained staff	School offered 1% white milk vs. whole or flavored, served recommended portion sizes, offer low-calorie/fat foods and provide more fruit and vegetables.  Target: Child:  Delivery: Cafeteria staff  Change in Intake: increased fruit/veggie intake and offer less fatty foods	Family-focused intervention promoting physical activity and reducing TV and video time.  Target: Parent/Caregiver Child Family  Delivery: Teacher, trained staff  Frequency: three family event nights at the school during intervention period	Class walks, in-class exercises (active movements and dance), active recess and school PE  Target: Child  Delivery: Teacher  Duration: 60 minutes total  Frequency: each day of intervention	Target: Child,  Delivery: Teacher  Comments: Reducing TV and video time.	Intervention: Goal setting, Family events  Target: Child, Family,  Delivery: Researcher, Teacher  Comments: Parents attending family nights set specific behavioral goals with trained staff regarding changes that could be made in the home environment to foster healthy eating and physical activity. Family events were held at the schools and included a meal for the family, several interactive and experiential station booths, and engaging physical activities designed to encourage home environment goals. They were also provided take-home incentives (e.g., magnets with behavioral messages,	

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			Frequency: three family event nights at the school during intervention period					refrigerator water dispenser, vegetable steamer, basketball, jump rope, and fresh fruits/vegetables). Parents received motivational encouragement telephone calls.	
Brandstetter, 2012 <sup>27</sup>	2	URMEL-ICE  Length of Intervention (weeks): 38  Setting: School: Health promoting behavior change Home: family homework lessons, training and information of parents	Health promotion behavior change targeting drinking sugar-sweetened beverages. Drinking water instead of soft drinks, discovering "hidden" sugar in drinks.  Target: Child, Parent/Caregiver, Family:  Delivery: Teacher  Frequency: 29 teaching units each 30-60mins		Health promotion behavior change targeting physical activities, encouraging everyday physical activities and learning about local sports and leisure physical activities.  Target: Child  Delivery: Teacher,  Frequency: 29 teaching units each 30-60mins	2 short blocks of physical activity exercises a day.  Target: Child  Delivery: Teacher  Duration: 5-7minutes per day	Target: Child,  Delivery: Teacher  Comments: Health promotion behavior change to reduce spending time with screen media and engaging in leisure activities without TV.	Intervention: Parental involvement  Comments: 6 family homework lessons (tasks that cannot be accomplished by the child himself without the help of a parent) and materials for the training and information of the parents.	
Llargues, 2011 <sup>28</sup>	2	Education about food habits and	Classroom education about dietary choices		Classroom education about activity and materials and games			Intervention: family/home  Comments: During the	



Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		physical activity  Length of Intervention (weeks): 104  Setting: School: 3h per week in classroom to develop activities related to health food habits and/or physical activity. This time was part of regular classes math, science, language, knowledge of the environment, developing posters, food tables, games, crafts, cooking workshops and promotion of games in the playground	and recipes given out to try at home.  Target: Child , Family  Delivery: Teacher  Duration: 3hrs weekly split between diet and activity		for break time.  Target: Child Family  Delivery: Teacher,  Duration: 3h weekly split between diet and activity			study period, each family in the intervention group received monthly recipes for a balanced diet taking into account traditional food habits. The families also received a guide of the local areas and paths to exercise during weekends and books about balanced eating were recommended.	
Lloyd, 2012 <sup>29</sup>	2	Length of Intervention (weeks): 52	Decrease in the consumption of sweetened fizzy drinks,		Promote positive attitudes and norms towards healthy eating		Target: Child  Delivery: Researcher,	Intervention: Goal setting, Social support; awareness	Based on the Information, Motivation and Behavioral Skills Model, 24 which proposes that adequate information, motivation and behavioral

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		Setting: School: newsletters, plays, homework, assembly Home: multiple activities involving home and parents	an increase in the proportion of healthy snacks (HS) to unhealthy snacks consumed  Target: Child :  Delivery: Professional dancers/sports men  Duration: 1.5 in term 1; 2 hours in term 2  Frequency: 2 in term 1; 5 in term 2  Comments: Promote positive attitudes and norms towards healthy eating and physical activity through activity workshops.		and physical activity through activity workshops.  Increase self-awareness and prioritize healthy goals. Consolidate social support  Target: Parent/Caregiver Child  Delivery: Professional dancers/sportsmen  Duration: 1.5  Frequency: 2 per semester		Teacher	Target: Child, Parent/Caregiver,  Delivery: Researcher, Teacher  Comments: *PSHE lessons (5) (morning) (1 h)  xDrama (5) (afternoon) (forum theatre; role play; food tasting, discussions, games, etc) (2 h), Goal setting sheet in Phase 3; goal setting interview in the summer term & Autumn 2	skills are essential to behavior change.  Uses highly inclusive and interactive drama activities, which are built around four characters (Disorganized Duncan, Football Freddie, Snackys Sam and Active Amy) with whom the children identify. During the Healthy Lifestyles Week (Phase 2), children work closely with the character most like them to help them to change their behaviors. In Phase 3, the children reflect on their own lifestyle behaviors around diet and activity and set simple goals with their parents.
Williamson, 2012 <sup>30</sup>	2	Environmental modification  Length of Intervention (weeks): 121	Providing campaign materials in the classroom, hallways, and other locations within the	Cafeteria staff in collaboration with research dieticians will increase the availability of fruits, vegetables,	Posters in the classroom that are designed to promote decreased sedentary behavior and increased physical activity. The	Incorporating regular 5 minute physical activity breaks after 30 minutes of instruction, by engaging in educational activities that increase physical activity.			Interventions complex and duration/timing largely unspecified.  Info from the methods and design article

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		Setting: School: change in food from school cafeterias and vending machines; PA in class, during recess and PE classes Home: newsletters sent home providing campaign-specific information	school via media (e.g., posters). The Cafeteria staff will be provided continuing education regarding proper cooking methods, serving correct portion sizes and limiting “seconds” of high fat foods. Direct children to healthy food choices in the school cafeterias. The “Healthy Tip of the Day” will be recognized by the classroom teacher or cafeteria manager and communicated to the students prior to lunch. Family members will learn the same principles taught to the students through the primary prevention program at	and whole grains. Altering presentation and recipes to increase appeal. Cafeteria staff will also be prompted to reduce the availability of foods with high dietary fat and sugar. Advertisement and consumption of soft drinks, candy, and fast foods will be limited and eventually eliminated. Foods available in vending machines will be modified  Target: Child Cafeteria staff  Delivery: Researcher, Cafeteria staff	Sports, Play and Active Recreation for Kids (SPARK) curriculum will be provided to support PE teachers. Family members will learn the same principles taught to the students through the primary prevention program at school  Target: Child Family Educator  Delivery: Teacher	Teachers are encouraged to increase physical activity during recess by provision of outdoor equipment supplied in PACs  Target: Child Educator  Delivery: Teacher			

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>school. Bi-monthly newsletters will be sent home including MyPyramid refrigerator magnets and More Matters rulers. Furthermore, menus will be sent to parents</p> <p>Target: Child , Family, Cafeteria staff</p> <p>Delivery: Researcher, Cafeteria staff</p>						
Williamson, 2012 <sup>30</sup>	3	<p>environmental program with an added classroom and internet education component</p> <p>Length of Intervention (weeks): 121</p> <p>Setting: School: change in food from school cafeterias and</p>	<p>Arm 2+ weekly lessons on healthy eating that are delivered by designated teachers who are trained to deliver the intervention in professional development workshops. diet website access with a chat function</p>	<p>Arm2 Target: Child: Cafeteria staff</p> <p>Delivery: Researcher, Cafeteria staff</p>	<p>Arm 2+ weekly lessons on exercise that are delivered by designated teachers who are trained to deliver the intervention in professional development workshops.</p> <p>Target: Child, Family, Educator, Teacher</p> <p>Frequency: 1 lessons on healthy eating and exercise</p>	Arm2 Target: Child, Educator, Teacher:			

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/environmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		vending machines; PA in class, during recess and PE classes Home: newsletters sent home providing campaign-specific information Health Informatics: internet-based intervention	Target: Child  Family: Cafeteria staff  Delivery: Researcher, Teacher, Cafeteria staff  Frequency: 1 lessons on healthy eating and exercise						
Siegrist, 2011 <sup>31</sup>	2	JuvenTUM  Setting: School: educate students, parents and teachers; alter school environments for diet and PA	As part of the monthly 3-part lessons, learned about healthy eating  Target: Child  Duration: 45 minutes per lesson  Frequency: Monthly  Comments: More power through healthy eating. Participate in fun and interesting games and solve riddles	Measures were taken to improve the quality of food sold at school snack bars and school stores.	Teacher trainings (9 hrs total) were conducted with the objective of increasing their students' physical activity during lessons and breaks and improving physical education within their schools.  Monthly three-part lessons: a warm-up of 10 min with running, playing running games at high intensity, 30 min exercises to improve body awareness and self-esteem with conversation in class about health-related topics, and 5	Measures were taken to arrange the classrooms, halls, and playgrounds in a way to promote more physical activity.			For further details about the program, visit <a href="http://www.juventum.med.tum.de">http://www.juventum.med.tum.de</a>

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/envi- ronmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			about healthy nutritional behaviors.		min relaxation exercises  Target: Parent/Caregiver, Child, Educator  Delivery: Researcher, Teacher  Duration: 45 minutes per lesson  Frequency: Monthly  Teacher training: 9 hours total  Comments: main topics for the 10 health-related themes: 1. Solve body riddles and play games to improve body awareness. 2. Perform fitness tests for cardiovascular fitness, coordination, flexibility, and muscle strength. 3. Observe and recognize breathing and heart rate while exercising at different intensities (running, walking, and rest). 4. Playing outside creatively.				

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/envi- ronmental Dietary Intervention	Psychosocial physical activity/ Exercise Intervention	Physical/environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
					5. Participate in sports to improve your well-being and to do even better in school. 6. Children present different sports to their classmates. 7. Step by step – fit. Assess activity over 3 days through the use of pedometers. 9. Strengthening the back, body awareness, and self-confidence. Juggle, balance, and perform circus games to improve posture and body awareness. 10. My body – through my senses. Solve riddles and play games using the senses of touch, smell, hearing, and proprioception.				

BMI = Body Mass Index; CATCH = Coordinated Approach to Child Health; CATCH BP = Coordinated Approach to Child Health Basic Plus; CATCH BPC = CATCH BP and Community; CATCH GO = CATCH program foods labeled healthy foods; FLASH = Fun Learning Activities for Student Health; FV = Fruits and vegetables; FVFIRST = Fruits and vegetables first; GEMS = Girls health Enrichment Multi-site Studies; h/d = hours per day; HDRINK = Healthy Drinks first; Hrs = hours; KCP = Kid’s Choice Program; KISS = Kinder-Sportstudie; KLF = Kids Living Fit; MVPA = moderate to vigorous physical activity; NR = Not Reported; PA = Physical activity; PACs = Physical activity checklist; PE = Physical Education; PEEP = Physical Education Enrichment Program; PSHE = Personal, Social, and Health Education; RD = Registered Dietitian; SNPI = School Nutrition Policy Initiative; SPARK = Sports, Play and Active Recreation for Kids; TV = television; URMEL-ICE; VCR = Videocassette recorder; WASPAN = West Australian Schools Physical Activity and Nutrition Project

Evidence Table 10a. Weight related outcomes for diet intervention studies taking place in a school setting with a home component

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow-up timepoint in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow-up timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
% Overweight																
Simonetti D'Arca, 1986 <sup>23</sup>	1	596	22.0%	52	596	22.2%	+0.8									
	2	367	27%	52	367	23.7%	-12.1									
	3	358	24.3%	52	358	23.7%	-2.3									
% Obese																
Simonetti D'Arca, 1986 <sup>23</sup>	1	596	11.4%	52	596	12.1%	+5.9									
	2	367	13.3%	52	367	11.7%	-12.2									
	3	358	10.6	52	358	11.2	+5.3									

N = Sample Size; SD = Standard Deviation



Evidence Table 10b. Weight related outcomes for diet intervention studies taking place in a school setting with a home component, subgroups

Author, year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First followup measure, mean (SD)	Mean change from base-line (SD)	Second follow-up timepoint in weeks	N Second followup	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
% Overweight																	
Simonetti D'Arca, 1986 <sup>23</sup>	1	males	70	22.2%	52	73	23.2%										
	2		51	25.0%	52	49	24.0%										
	3		39	19.6%	52	44	22.2%										
	1	females	61	21.7%	59	NR	21.0%										
	2		48	29.4%	52	38	23.3%										
	3		48	30.2%	52	41	25.8%										
% Obese																	
Simonetti D'Arca, 1986 <sup>23</sup>	1	males	23	7.3%	52	28	8.9%										
	2		29	14.2%	52	27	13.2%										
	3		19	9.5%	52	20	10.0%										
	1	females	45	16%	52	44	15.7%										
	2		20	12.3%	52	16	9.8%										
	3		19	11.9%	52	20	12.6%										

N = Sample Size; NR = Not Reported; SD = Standard Deviation

Evidence Table 11a. Weight related outcomes for physical activity intervention studies taking place in a school setting with a home component

Author, year	Arm	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followu p time-point in weeks	N Second follow-up	Second followup measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final followup measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
BMI (Kg/m2)																
Kriemler, 2010 <sup>13</sup>	1	205	17.04(2.63)	43	205	17.44 (2.89)										Adjusted difference at follow-up: -0.12 CI: -0.19 to -0.04  p=0.003
	2	297	17.13(2.53)	43	297	17.36(2.67)										
Robinson, T. N., 1999 <sup>19</sup>	1	103	18.10(3.77)	30	100	18.81 (3.76)										Adjusted change: -0.45 CI: -0.73 to -0.17  p=0.002
	2	95	18.38(3.67)	30	92	18.67 (3.77)										
Waist circumference in cm																
Kriemler, 2010 <sup>13</sup>	1	205	57.66(6.43)	43	205	59.86 (7.39)										Adjusted difference at follow-up: -0.08 CI: -0.2 to

Author, year	Arm	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second follow-up	Second followup measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final followup measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
																0.05
	2	297	57.95(6.94)	43	205	59.45 (6.94)										p=0.25
Robinson, T. N., 1999 <sup>19</sup>	1	103	59.51(8.91)	30	100	64.73 (8.91)										Adjusted change: -2.30 CI: -3.27 to 1.33 p= 0.001
	2	95	60.48 (9.91)	30	92	63.57 (8.96)										
<b>Skinfold thickness in mm</b>																
Kriemler, 2010 <sup>13</sup>	1	205	31.32 (12.82)	43	205	33.70 (17.24)										Adjusted difference at follow-up: -0.12 CI: -0.21 to -0.03 p= 0.009
	2	297	32.11(13.23)	43	297	32.50 (14.67)										
Robinson, T. N., 1999 <sup>19</sup>	1	103	13.97(5.43)	30	100	16.46 (5.27)										Adjusted change: -1.47 CI: -2.41 to 0.54 p=0.002
	2	95	14.55(6.06)	30	92	15.47										

Author, year	Arm	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second follow-up	Second followup measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final followup measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
						(5.95)										
Hip circum-ference, cm																
Robinson, T. N., 1999 <sup>19</sup>	1	103	72.7 (8.78)	30	100	76.79 (8.37)										Adjusted change: -0.27 CI: -1.08 to 0.53 P=0.50
Robinson, T. N., 1999 <sup>19</sup>	2	95	72.78 (8.91)	30	92	76.53 (7.94)										
Waist to hip ratio																
Robinson, T. N., 1999 <sup>19</sup>	1	103	.82 (.05)	30	100	.84 (0.05)										Adjusted change: -0.02 CI: -0.03 to -0.01 P=<0.001
Robinson, T. N., 1999 <sup>19</sup>	2	95	.83 (.05)	30	92	083 (.06)										

CI = Confidence Interval; N = Sample Size; SD = Standard Deviation

**Evidence Table 11b. Weight related outcomes for physical activity intervention studies taking place in a school setting with a home component, subgroups**

Author, year	Arm	Sub-group	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second follow- up time- point in weeks	N Second follow- up	Second followup measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base- line (SD)	Measure of Association
<b>BMI change</b>																	
Simon, 2008 <sup>22</sup>	1	Initially- Non overweight students		17.33 CI:17.02 to 17.63	43		17.84 CI:17.53 to 18.14	-0.04 (-0.16; 0.08) p=.50	95		18.71 CI:18.40 to 19.01	-0.18 (-0.36; -0.01) p=.03	199		20.16 CI:19.86 to 20.46	-0.33 (-0.57; - 0.08) p<.0.01	
	2			17.20 CI:16.89 to17.52	43		17.67 CI:17.36 to 17.98		95		18.40 CI:18.09 to 18.71		199		19.71 CI:19.41 to 20.02		
	1	Initially Overweight students.		23.94 CI:23.25 to 24.63	43		24.51 CI:23.80 to 25.21	0.13 (-0.25; 0.51) p=0.51	95		25.57 CI:24.87 to 26.27	-0.40 (- 0.94; 0.13) p=0.13	199		26.33 CI:25.60 to 27.05	0.20 (-0.58 ;0.98) p=0.62	
	2			23.82 CI:23.12 to 24.52	43		24.51 CI:23.81 to 25.21		95		25.04 CI:24.34 to 25.75		199		26.40 CI:25.67 to 27.13		
<b>Fat mass index</b>																	
Simon, 2008 <sup>22</sup>	1	Initially overweight participants		7.04 CI:6.60 to 7.49	43		6.91 CI:6.46 to 7.36	-0.03 (-0.37; 0.30 ) p=.84	95		7.52 CI:7.06 to 7.97	-0.23 (-0.70; 0.23) p=0.33	199		7.39 CI:6.90 to 7.89	0.37 (-0.32; 1.05) p=0.29	
	2			6.83 CI:6.41 to 7.24	43		6.83 CI:6.41 to 7.24		95		7.06 CI:6.65 to 7.48		199		7.54 CI:7.10 to 7.98		
	1	Initially- Non overweight students.		2.70 CI:2.44 to 2.97	43		2.74 CI:2.48 to 3.00	-0.08 (- 0.17; 0.02) p=0.12	95		3.20 CI:2.94 to 3.46	-0.19 (-0.32; -0.05) p<0.01	199		3.74 CI:3.48 to 3.99	-0.20 (-0.39; - 0.01) p<0.05	

Simon, 2008 <sup>22</sup>	2			2.65 CI:2.39 to 2.92	43		2.61 CI:2.35 to 2.88		95		2.96 CI:2.70 to 3.23		199		3.49 CI:3.23 to 3.75		
<b>Fat free mass index</b>																	
Simon, 2008 <sup>22</sup>	1	Initially overweight participants		16.85 CI:16.65 to 17.13	43		17.54 CI:17.24 to 17.83	0.16 (-0.08; 0.40) p=0.84	95		17.97 CI:17.68 to 18.26	-0.13 (-0.45; 0.20) p=0.45	199		18.70 CI:18.38 to 19.01	0.02 (-0.44; 0.48) p=0.92	
	2			17.03 CI:16.74 to 17.32	43		17.88 CI:17.59 to 18.18		95		18.03 CI:17.73 to 18.32		199		18.90 CI:18.59 to 19.22		
	1	Initially non- overweight		14.62 CI:14.42 to 14.83	43		15.09 CI:14.89 to 15.29	0.04 (- 0.04; 0.12) p=0.36	95		15.51 CI:15.31 to 15.71	0.00 (-0.11; 0.11) p=.95	199		16.42 CI:16.23 to 16.62	-0.12 (-0.28; 0.04) p=0.14	
	2			14.55 CI:14.35 to 14.76	43		15.06 CI:14.85 to 15.26		95		15.44 CI:15.23 to 15.64		199		16.23 CI:16.03 to 16.44		
<b>% Body fat</b>																	
Simon, 2008 <sup>22</sup>	1	InitiallyNon over-weight students.		15.08 CI:14.01 to 16.15	43		14.83 CI:13.77 to 15.89	-0.38 (-0.80; 0.04) p=0.07	95		16.45 CI:15.39 to 17.51	-0.75 (-1.34; -0.16) p<0.01	199		17.88 CI:16.83 to 18.93	-0.20 (-0.39; - 0.01) p < 0.05	
	2			14.87 CI:13.79 to 15.94	43		14.24 CI:13.16 to 15.31		95		15.49 CI:14.41 to 16.56		199		17.12 CI:16.06 to 18.18		
	1	Initially Overweight students.		28.95 CI:27.71 to 30.20	43		27.80 CI:26.52 to 29.08	-0.35 (- 1.35; 0.65) p=0.49	95		28.73 CI:27.45 to 30.00	-0.46 (- 1.84; 0.91) p=0.51	199		27.12 CI:25.74 to 28.49	1.33 (- 0.61; 3.28) p=0.18	
	2			28.15 CI:26.89 to 29.40	43		26.64 CI:25.37 to 27.91		95		27.46 CI:26.17 to 28.74		199		27.64 CI:26.27 to 29.01		

CI = Confidence Interval; N = Sample Size; SD = Standard Deviation

**Evidence Table 11c. Clinical outcomes for physical activity intervention studies taking place in a school setting with a home component**

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Cardiovascular risk score								
Kriemler, 2010 <sup>13</sup>	1	205	0.06(.53)	39	205	−0.03(.51)		Adjusted difference at follow-up: -0.18 (-0.29 to -0.06) p=0.003
	2	297	0.01(.49)	39	297	−0.27(.44)		
SBP								
Kriemler, 2010 <sup>13</sup>	1	205	103(8)	39	205	102(9)		Adjusted difference at follow-up: -0.08 (-0.26 to -0.23) p=0.88
	2	297	104(9)	39	297	101(9)		
Simon, 2008 <sup>22</sup>	1	479	107.14 CI:106.10 to 108.18	199		113.85 CI:112.63 to 115.06	-0.42 (-2.29; 1.44) p=0.66	Intervention X Time interaction, p<0.01
	2	475	108.91 CI:107.86 to 109.96	199		115.20 CI:114.02 to 116.37		
DBP								
Kriemler, 2010 <sup>13</sup>	1	205	61(7)	39	205	61(8)		Adjusted difference at follow-up: -0.08 (-0.26 to -0.23) p=0.88
	2	297	62(8)	39	297	60(7)		
Simon, 2008 <sup>22</sup>	1	479	64.12 CI:62.27 to 65.98	199		65.82 CI:63.99 to 67.65	-0.46 (-2.14; 1.23) p=0.60	Interaction X Time interaction, p=0.01
	2	475	65.38 CI:63.53 to 67.23	199		66.61 CI:64.78 to 68.44		
Plasma insulin								
Simon, 2008 <sup>22</sup>	1	479	8.61 CI:8.02 to 9.19	199		11.03 CI:10.36 to 11.70	0.03 (-0.98; 1.04) p=0.96	Interaction X Time interaction, p=0.85
	2	475	8.57 CI:7.97 to 9.17	199		11.02 CI:10.34 to 11.71		
HOMA								
Simon, 2008 <sup>22</sup>	1	479	1.97 CI:1.83 to 2.11	199		2.42 CI:2.26 to 2.57	0.01 (-0.23; 0.24) p=0.95	Interaction X Time interaction, p=0.90
	2	475	1.96 CI:1.82 to 2.10	199		2.41 CI:2.25 to 2.57		

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Plasma Triglyceride</b>								
Simon, 2008 <sup>22</sup>	1	479	70.08 CI:66.85 to 73.31	199		65.65 CI:61.98 to 69.32	-2.60 (-7.97; 2.78) p=0.34	Interaction X Time interaction, p=0.19
	2	475	75.20 CI:71.92 to 78.47	199		68.17 CI:64.47 to 71.86		
<b>Plasma Total cholesterol</b>								
Simon, 2008 <sup>22</sup>	1	479	152.67 CI:149.65 to 155.68	199		160.21 CI:156.96 to 163.45	2.71 (-0.91; 6.34) p=0.15	Interaction X Time interaction, p=0.19
	2	475	157..57 CI:154.44 to 160.70	199		167.83 CI:164.53 to 171.12		
<b>Plasma HDL</b>								
Simon, 2008 <sup>22</sup>	1	479	48.23 CI:44.85 to 51.60	199		54.88 CI:51.60 to 58.17	3.43 (1.73; 5.13) p<0.0001	Interaction X Time interaction, p<0.0001
	2	475	47.99 CI:44.67 to 51.32	199		58.08 CI:54.82 to 61.35		
<b>Plasma Glucose</b>								
Simon, 2008 <sup>22</sup>	1	479	0.92 CI:0.91 to 0.92	199		0.88 CI:0.87 to 0.89	0.00 (-0.01; 0.01) p=0.81	Interaction X Time interaction, p=0.86
	2	475	0.92 CI:0.91 to 0.92	199		0.88 CI:0.87 to 0.89		
<b>Triglyceride</b>								
Kriemler, 2010 <sup>13</sup>	1	205	.64(0.29)	39	205	.69(0.32)		Adjusted difference: -0.10 (-0.18 to -0.01) p<0.02
	2	297	.60(.25)	39	297	.60(.25)		
<b>HDL</b>								
Kriemler, 2010 <sup>13</sup>	1	205	1.60(0.35)	39	205	1.55(0.37)		Adjusted difference: 0.27 (0.09 to 0.44) p<0.003
	2	297	1.65(0.35)	39	297	1.68(0.35)		
<b>Glucose</b>								
Kriemler, 2010 <sup>13</sup>	1	205	4.6(0.4)	39	205	4.7(0.4)		Adjusted difference: -0.40 (-0.70 to -0.09) p<0.01
	2	297	4.5(0.4)	39	297	4.6(0.3)		
<b>Physical Quality of life</b>								



Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Kriemler, 2010 <sup>13</sup>	1	205	53.2 (7.7)	39	205	53.9 (6.5)		Adjusted difference: 0.42 (-1.23 to 2.06) p=0.62
	2	297	53.4 (8.9)	39	297	53.7(8.7)		
Psychological Quality of life								
Kriemler, 2010 <sup>13</sup>	1	205	53.0 (6.5)	39	205	52.0 (7.3)		Adjusted difference: 0.59 (-0.85 to 2.03) p=0.42
	2	297	52.5(6.9)	39	297	52.3(7.7)		

CI = Confidence Interval; DBP = Diastolic Blood Pressure; HDL = High Density Lipoprotein; HOMA = Homeostatic Model Assessment; N = Sample Size; SBP = Systolic Blood Pressure; SD = Standard Deviation

**Evidence Table 11d. Intermediate related outcomes for physical activity intervention studies taking place in a school setting with a home component, subgroups**

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of association
<b>Total PA (counts/min)</b>									
Kriemler, 2010 <sup>13</sup>	1—control	205	792	47	205	728		0.21 (adjusted difference at follow-up)	p=0.31
	2—intervention	297	770		297	726			
<b>Total PA (counts/min) in school</b>									
Kriemler, 2010 <sup>13</sup>	1—control	205	828	47	205	738		0.92 (adjusted difference at follow-up)	p=0.003
	2—intervention	297	807		297	870			
<b>Total PA (counts/min) out of school</b>									
Kriemler, 2010 <sup>13</sup>	1—control	205	777	47	205	722		-0.14 (adjusted difference at follow-up)	p=0.41
	2—intervention	297	755		297	653			
<b>Total MVPA (min/day)</b>									
Kriemler, 2010 <sup>13</sup>	1—control	205	106		205	97		0.44 (adjusted difference at follow-up)	p=0.03
	2—intervention	297	106		297	106			
<b>Total MVPA (min/day) in school</b>									
Kriemler, 2010 <sup>13</sup>	1—control	205	37	47	205	32		1.19 (adjusted difference at follow-up)	p<0.001
	2—intervention	297	38		297	45			
<b>Total MVPA (min/day) out of school</b>									
Kriemler, 2010 <sup>13</sup>	1—control	205	69	47	205	66		-0.06 (adjusted difference at follow-up)	p=0.72
	2—intervention	297	67		297	61			
<b>Hours per wk of TV</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	15.46	26	100	14.46		-5.53 (adjusted change)	p<.001
	2—intervention	95	15.35		92	8.80			
<b>Hours per wk of Videotapes</b>									

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of association
Robinson, 1999 <sup>19</sup>	1—control	103	5.52	26	100	5.21		-1.53 (adjusted change)	p=0.11
	2—intervention	95	4.74		92	3.46			
<b>Hours per wk of video games</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	3.85	26	100	4.24		-2.54 (adjusted change)	p=0.01
	2—intervention	95	2.57		92	1.32			
<b>Other sedentary behaviors (h/day)</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	4.47	26	100	4.05		-0.34 (adjusted change)	p=0.44
	2—intervention	95	4.66		92	3.81			
<b>PA, metabolic equivalent-weighted, min/wk</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	310.2	26	100	337.8		-16.7(adjusted change)	p=0.60
	2—intervention	95	396.8		92	362.3			
<b>Parent report of child hours per week of TV</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	14.90	26	75	14.75		-4.29 (adjusted change)	p<0.001
	2—intervention	95	12.43		68	8.86			
<b>Parent report of child hours per week of videotapes</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	4.41	26	75	3.91		-0.25 (adjusted change)	p<0.60
	2—intervention	95	4.96		68	2.57			
<b>Parent report of child hours per week of video games</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	2.71	26	75	2.57		-0.76 (adjusted change)	p<0.13
	2—intervention	95	1.84		68	1.44			
<b>Parent report of child hours per week of overall TV use, 0-16 scale</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	8.60	26	75	7.76		-0.77 (adjusted change)	p<0.10
	2—intervention	95	7.09		68	6.09			
<b>Parent report of child other sedentary behavior, h/wk</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	39.79	26	75	43.37		-4.88 (adjusted change)	p<0.16
	2—intervention	95	44.89		68	41.31			
<b>Parent report of child PA, h/wk</b>									
Robinson, 1999 <sup>19</sup>	1—control	103	9.19	26	75	17.21		-2.00 (adjusted change)	p<0.13
	2—intervention	95	11.19		68	16.08			

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of association
<b>Supervised leisure PA, h/wk</b>									
Simon, 2008 <sup>22</sup>	1—control	475	2.70	208	NR	2.55	-0.15	1.1	p<0.0001
	2—intervention	479	2.50		NR	3.45	0.95		
<b>TV/video time, minutes per day</b>									
Simon, 2008 <sup>22</sup>	1—control	475	103.99	208	NR	99.43	-4.56	-15.71	p<0.01
	2—intervention	479	108.18		NR	87.91	-20.27		
<b>Active commuting between home and school, minutes per day</b>									
Simon, 2008 <sup>22</sup>	1—control	475	17.76	208	NR	25.06	7.8	1.04	p=0.10
	2—intervention	479	16.19		NR	25.03	8.84		

CI = Confidence Interval; I-C = Difference between intervention and control group; MVPA = Moderate to Vigorous Physical Activity; N = Sample Size; P = p-value; PA= Physical Activity; SD = Standard Deviation; wk = week

**Evidence Table 12a. Weight related outcomes for combined diet and physical activity intervention studies taking place in a school setting with a home component**

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
<b>BMI percentile (change)</b>																
Dzewalto-wski, 2010 <sup>6</sup>	1	112		52	112		0.9 (0.4)	104	112		0.2(.3)					P=0.17
	2	134		52	134		0.1 (0.3)	104	134		0.1(.3)					
Hollar, 2010 <sup>11</sup>	1	737	NR	34 weeks	NR		-0.95 (23.2)	68 weeks	NR		-0.47 (12.1)					
	2	3032	NR	34 weeks	NR		-1.46 (16.3)	68 weeks	NR		-1.73 (13.6)					
<b>BMI, z-score</b>																
Dzewaltowski, 2010 <sup>6</sup>	1	112		52	112		0.1 (0.1)	104	112		0.0 (0.1)					P=0.11
	2	134		52	134		-0.1 (0.1)	104	134		-0.1 (0.1)					
Schetzina, 2009 <sup>20</sup>	No control arm in this study; interven- -tion only															
	2	114	0.60 (1.07) Range: -1- 2	30	114	0.65 (1.13) Range: -1.5-2.0	0.05 (0.42)									
Foster, 2008 <sup>7</sup>	1	364	0.66	104	364	0.76	0.10								Adjusted diff.: -0.01 (95% CI: -0.08 to 0.06)	P= 0.8
	2	479	0.73	104	479	0.80	0.07									

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
Story, 2012 <sup>26</sup>	1	187	0.42; SE = 0.14					~84 weeks		0.64; SE = 0.14						No statistic- ally sig- nificant change in BMI, BMI-Z, skinfold or % body fat was associated with inter- vention.
Story, 2012 <sup>26</sup>	2	267	0.58; SE = 0.12							0.80; SE =0.12						
Williamson, 2012 <sup>30</sup>	1	587	0.82; SE = 1.12													F test; p-value NS
	2	713	0.83; SE = 1.22									112				
	3	760	0.71; SE= 1.123									112				
BMI Kg/m2																
Burke, 1998 <sup>1</sup>	1 Con- trol	240	17.6 (2.5)		240	18.0 (2.4)			240	18.7 (2.6)						
	2 WASP- AN	272	17.9 (2.7)		272	18.5 (2.9)			272	19.0 (3.1)						
	3 PEEP	288	18.2 (2.7)		288	18.7 (2.9)			288	19.4 (3.1)						
Caballero, 2003 <sup>2</sup>	1	825	19.1	156	682	22.2										Mean difference: -0.2; (95% CI: - 0.50 to 0.15); P=0.298
	2	879	19.0	156	727	22.0										
Danielzik, 2007 <sup>4</sup>	1	1420	Median = 15.4; Interquartil e Range	208	1420	Median = 17.2; Inter- quartile	Median = 1.8; Inter- quartile range	416	952	Median 20.0; Inter- quartile	Median 4.7; Inter- quartile					0.-1

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
			(14.6- 16.4)			Range (15.8- 19.6)	(0.9-3.3)			Range (18.7- 22.3)	range (3.5 to 6.3)					
	2	344	Median 15.6; Range (14.8- 16.7)	208	344	Median 17.5; Range (16.0- 19.1)	1.7 Inter- quartile range (0.7-3.1)	416	240	Median 20.3; Inter- quartile Range (18.9 to 22.5)	Median 4. 6; Inter- quartile range (3.5 to 6.2)					
Foster, 2008 <sup>7</sup>	1	364	20.76	104	364	22.86	2.10								Adjusted diff: -0.04  (95% CI: -0.27 to 0.19)	P= 0.71
	2	479	21.07	104	479	23.06	1.99									
Hopper, 2005 <sup>12</sup>	1	96	17.69	34	NR	18.44										NS
	2	142	17.83	34	NR	18.15										
Manios, 1998 <sup>15</sup>	1	162	16.3(2.3)	156	162	18.0(3.1)	1.7 (1.4)									P<.0005
	2	231	16.2(2.2)	156	162	16.9(3)	0.7 (1.5)									
Nader,1999 <sup>18</sup>	1	2117	17.6 SE=0.1									312 weeks	1496	22.1 SE=0.1		P=0.79
	2	2989	17.6 SE=0.1									312 weeks	2164	22.0 SE=0.1		
Shofan, 2011 <sup>21</sup>	1	26	18.9 ± 4.3 (Range13. 4-33)	104	26	19.4 ± 4.6 (Range13- 31 )	0.48 ± 1.23 (-2- 3.5) (Range - 2-3.5)									
	2	82	17.9 ± 3.9 Range: 11.5-33	104	82	18.7 ± 4.6 (Range12- 38)	0.94 ± 1.5 (-2.9- 5.5) Range: (- 2.9-5.5)									

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
Brandstetter, 2012 <sup>27</sup>	1	495	16.24 (2.10)	52	495	NR										Differences between control and intervention group = -0.06 (95% CI: -0.21- 0.10)
	2	450	Median (SD) =16.23(2. 25)		450	NR										
Llargues, 2011 <sup>28</sup>	1	237	16.5 ; (95% CI 16.7 to 17.5)					104		18.3; 95% CI (16.7 to 17.5)						NR
	2	272	Median (SD) =17.1; (95% CI: 16.7 to 17.5)							17.9; (95% CI:17.4 to 18.4)						
Story, 2012 <sup>26</sup>	1	187	16.52 ; SE = 0.36;					~84		17.62; SE = 0.36						
	2	267	16.85; SE = 0.30							18.29; SE = 0.31						Net difference effect =0.34; SE = 0.17; p- value =0.057
Siegrist, 2011 <sup>31</sup>	1	297	17.3 (3.0)	52	297	17.9 (3.3)										
	2	422	17.4, (2.9)		422	18.1 (3.2)										Mean difference in change between groups= -0.1 persons (95% CI -0.2- 0);



Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
																p-value= 0.165
<b>BMI-SDS (standard deviation score)</b>																
Lloyd, 2012 <sup>29</sup>	1	122	0.4(1.1) ; 95% CI (-2.0to2.9)	72	122			96	122							persons = -0.45 (95% CI: -0.82 - -0.08)
	2	80	0.3, (1.1); 95% CI (-2.3to2.5)		80				80							
<b>BMI-other</b>																
Lloyd, 2012 <sup>29</sup>	1	122	17.8 (2.8) ; (95% CI: 13.7 to 25.1)	72	122			96	122							mean difference =- 1.16 (95% CI: - 2.15--0.18)
	2	80	Median (SD) =17.4, (2.6); (95% CI: 13.3 to 25.4)		80				80							
<b>Incidence of Overweight</b>																
Foster, 2008 <sup>7</sup>	1	208		104	208	14.90%	14.90									Adjusted Odds=1.00
	2	268		104	268	7.46%	7.46									Adjusted Odds=0.65 (0.54-0.79) p<.001
<b>Incidence of Obese</b>																
Foster, 2008 <sup>7</sup>	1	266		104	266	6.39%	6.39									Adjusted Odds=1.0

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
	2	346		104	346	5.78%	5.78									Adjusted Odds=1.0 (0.66-1.52) P=.99
Prevalence of Overweight																
Foster, 2008 <sup>7</sup>	1	365	15.89%	104	365	20%	4.11									Adjusted Odds=1.0
	2	479	16.28%	104	479	14.61%	-1.67									Adjusted Odds=0.65 (0.54-0.79) P=<.001
Prevalence of Obese																
Foster, 2008 <sup>7</sup>	1	365	23.56%	104	365	24.93%	1.37									Adjusted Odds=1.00
	2	479	26.72%	104	479	27.97%	1.25									Adjusted Odds=1.09 (0.85-1.40) P=.48
Danielzik, 2007 <sup>4</sup>	1	1420	3.9	208	1420	5.1										Odds ratio at end of follow up period; 0.87, 95 % CI: 0.40 to 1.74, P=0.628
	2	344	3.8	208	344	5.2										
Prevalence of Obesity+Over- weight in All children																
Marcus, 2009 <sup>16</sup>	1	671	16.1%	208	430	18.9%	2.8%									(I-C) = -6.0, CI; -10.6 to - 1.3, P=<0.05
	2	719	20.3%	208	591	17.1%	-3.2%									
% Obese (>=95 <sup>th</sup> percentile)																
Speroni, 2007 <sup>24</sup>	1	105	8%	24	105	7%										
	2	80	33.5%	24	80	26%										
Story, 2012 <sup>26</sup>	1	187	14.01; SE = 4.08					~84 weeks		20.57; SE = 4.13						Net difference = 2.11%; SE = 3.11
	2	267	Median							25.68;						

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
			(SD) =17.01; SE = 3.44							SE = 3.47						
% Overweight																
Story, 2012 <sup>26</sup>	1	187	12.52 ; SE = 3.12					~84 weeks		22.31; SE = 3.23						Net difference = -10.14; SE = 4.14; p-value = 0.019
	2	267	Median (SD) =15.80; SE = 2.55							15.45; SE = 2.62						
Remission of Overweight																
Foster, 2008 <sup>7</sup>	1	144		104	144	7.64%	-7.64									Adjusted Odds=1.00
	2	206		104	206	10.68%	-10.68									Adjusted Odds=1.34 (0.71-2.54) P=.37
Danielzik, 2007 <sup>4</sup>	1	1420	5.2	1420	208	11.1										Odds ratio at end of follow up period; 0.83, CI: 0.57 to 1.31, P=0.497
	2	344	7.0	1420	208	10.2										
Remission of Obesity																
Foster, 2008 <sup>7</sup>	1	86		104	86	13.95%	-13.95									Adjusted Odds=1.00
	2	128		104	128	10.94%	-10.94									Adjusted Odds=0.84 (0.48-1.46) P=.54
Weight (kg)																
Burke, 1998 <sup>1</sup>	1	240	37.2 (7.2)		240	39.9 (7.5)			240	43.5 (8.5)						

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
	2	272	37.6 (7.9)		272	41.1 (9.0)			272	44.4 (10.0)						
	3	288	38.0 (7.5)		288	41.0 (8.5)			288	45.0 (9.4)						
<b>Total sample percent &gt; or equal to 85<sup>th</sup> percentile</b>																
Hoelscher, 2010 <sup>10</sup>	1	554	42 (0.02)	52 weeks	NR	40.7 (0.02)	-1.3									Difference between CATCH BPC and CATCH BP schools = -7.0, P=0.051
	2	553	47.4(0.02)			39.1 (0.02)	-8.3									
<b>Total sample percent &gt; or equal to 95<sup>th</sup> percentile</b>																
Hoelscher, 2010 <sup>10</sup>	1	554	23.9 (0.02)	52 weeks	NR	22 (0.02)	-1.9									Difference between CATCH BPC and CATCH BP schools = -1.7, P=0.33
	2	553	27.5 (0.02)			23.9 (0.02)	-3.6									
<b>Waist circumference in cm</b>																
Burke, 1998 <sup>1</sup>	1	240	59.4(5.8)		240	62.6(5.9)			240	63.8(6.4)						
	2	272	60.5(6.7)		272	63.5(7.0)			272	64.4(7.2)						
	3	288	60.7(6.5)		288	64.1(7.2)			288	65.6(7.5)						
Brandstetter, 2012 <sup>27</sup>	1	495	59.20(6.38 )	52	495											Differences between control and intervention group, SE = - 0.85 (95% CI: -0.1.59 - -0.12);

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
																P= NR
	2	450	Median (SD) =59.66, (6.65)		450											
Lloyd, 2012 <sup>29</sup>	1	122	62.6 (7.0) ; 95% CI (52 to 83)	72	122			96	122							
	2	80	Median (SD) =62.0, (6.5); 95% CI (50 to 81)		80			96	80							<p>First F/U: Mean difference (intervention minus control)= - 2.01 (95% CI -4.23-0.21); P=NR</p> <p>Second F/U: Mean difference (intervention minus control)= -2.97 (95% CI -5.36- -0.59); P=NR</p>
Siegrist, 2011 <sup>31</sup>	1	297	61.2(7.8)	52	297	62.0(8.6)										Mean difference in change between groups= 1.7 (95% CI: 1.2- 2.3); P<0.001
	2	425	Median (SD) =62.5(8.2)		425	61.6 (8.4)										

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
			;													
<b>Weight in kg</b>																
Caballero, 2003 <sup>2</sup>	1	825	32.9	156	682	49.0										Mean difference= -0.0; (95% CI: -0.86 to 0.86); P=0.996
	2	879	32.5	156	727	49.0										
Danielzik, 2007 <sup>4</sup>	1	1420	Median 22.0; Interquartil e Range (20.4- 24.5)	208	1420	Median 35.7; Inter- quartile Range (31.7- 42.0)	13.2	416	952	Median 57.0; Inter- quartile Range (51.3- 64.0)	Median 34.5; Inter- quartile Range (30.0- 40.2)					-0.5
	2	344	Median 22.5; Interquartil e Range (20.5- 24.5)	208	344	Median 36.1; Inter- quartile Range (31.7- 41.2)	13.5	416	240	Median 56.2; Inter- quartile Range )51.3- 63.5)	Median 34.0 Inter- quartile Range (29.7- 40.1)					
Hopper, 2005 <sup>12</sup>	1	96	31.11	34 weeks	NR	34.28										NS
	2	142	30.87	34 weeks	NR	33.60										NS
Shofan, 2011 <sup>21</sup>	1	26	35±10.3 (Range 13.4-33)	104	26	41.1±12.1 (Range 24-80)	6.1 ± 3.0 (Range 1.5-12.5)									
	2	82	32.5± 9.1 (Range 21-65)	104	26	38.6 ± 12.5 (Range 22-87)	6.4 ± 4.3 (Range - 2.5-21.5)									
<b>Skinfold Sum in mm</b>																
Hopper, 2005 <sup>12</sup>	1	96	26.69	34 weeks		28.00										NS

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
	2	142	26.29	34 weeks		27.42										
Percentage body fat																
Trevino, 2004 <sup>25</sup>	1	602	26.79 (10.8)	34 weeks	602	26.09 (10.9)	-0.71									Adjusted difference: 0.18, (95% CI: -0.45 to 0.81); P=0.56
	2	619	27.96 (11.5)	34 weeks	619	26.86 (11.1)	-1.10									
Story, 2012 <sup>26</sup>	1	187	16.84 ; SE = 0.93					~84 weeks		20.21; SE = 0.93						Net diff. effect=0.90; SE = 0.57; P=0.12
	2	267	17.75; SE = 0.79							20.21; SE = 0.93						
Williamson, 2012 <sup>30</sup>	1	352											121		4.9 (SE: 0.46)	F-statistic =2.68; P=>0.06
	2	419											121		3.7 (0.42)	
	3	419													3.9 (0.39)	
Triceps skinfold thickness in mm																
Caballero, 2003 <sup>2</sup>	1	825	13.3	156	682	17.2										Mean difference= 0.1, (95% CI: -0.67 to 0.83), P=0.837
	2	879	13.3	156	727	17.2										
Danielzik, 2007 <sup>4</sup>	1	1420	Median 10.3; Interquartil e Range (9.0-13.0)	208	1420	Median 14.3; Inter- quartile Range (10.1- 19.4)	Median 3.6; Inter- quartile Range (0.0-7.3)									NS

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
	2	344	Median 10.7; Interquartil e Range9.0- 13.9	208	344	Median 13.7; Interquartil e Range (10.2- 18.5)	Median 2.9; Interquart ile Range ( -0.5- 7.2)									
Nader, 1999 <sup>18</sup>	1	2117	12.5 SE = 0.1									312 weeks	1496	15.3 SE (0.2)		P=.95
	2	2989	12.4 SE = 0.1									312 weeks	2164	15.1 SE (0.2)		
Story, 2012 <sup>26</sup>	1	187	10.45 SE = 0.59					~84 weeks		11.50; SE =0.60						net difference effect = 00.02; SE = 0.67; P=0.978
	2	267	Med-ian =10.84; SE = 0.50					~84 weeks		11.91; SE =0.50						
Brandstetter, 2012 <sup>27</sup>	1	495	14.27(5.86 )	52	495	NR										Differences between control and intervention group, SE = - 0.50 (95% CI -1.53-0.53)
	2	450	Median (SD) =14.49, (6.37)		450	NR										
<b>Subscapular Skinfold thickness in mm</b>																
Caballero, 2003 <sup>2</sup>	1	825	10.6	156	682	15.0										Mean difference= -0.1, (95% CI: -0.85 to 0.70), P=0.848
	2	879	10.6	156	727	15.0										



Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow- up measure , mean (SD)	Mean Change from Base- line (SD)	Measure of Association
Nader, 1999 <sup>18</sup>	1	2117	8.34 SE = 0.12									312 weeks	1496	12.76 SE =0.20		P=0.73
	2	2989	8.21 SE = 0.10									312 weeks	2164	12.64 SE =0.17		
Story, 2012 <sup>26</sup>	1	167	6.93 ; SE = 0.55					~84 weeks		mean = 8.99; SE = 0.56;						Net difference effect = 00.05; SE = 0.44; P=0.909
	2	167	median =7.33; SE = 0.47							9.43; SE = 0.47						
Brandstetter, 2012 <sup>27</sup>	1	495	7.98(4.03)	52	495	NR										Differences between control and intervention group, SE = - 0.64 (95% CI: -1.25-0.02)
	2	450	Median (SD) =8.22, (4.64)		450	NR										
<b>Fat mass in %</b>																
Danielzik, 2007 <sup>4</sup>	1	952	Median20. 9; Interquartil e Range (16.5- 25.7)	416	952	Median = 22.3; Inter- quartile Range (16.6- 27.6)	Median = 1.5; Inter- quartile range (-3.6-6.3)									P=-0.4
	2	240	Median21. 0; Interquartil e Range (16.2- 25.5)	416	240	Median = 23.1; Inter- quartile Range(16. 8-27.9)	Median = 1.9; Inter- quartile range (-3.03- 6.6)									

BMI =Body Mass Index; BMI-Z = Body Mass Index Z-score; CATCH BP = Coordinated Approach to Child Health Basic Plus; CATCH BPC = CATCH BP and Community; CI = Confidence Interval; Diff.= difference; F/U = Follow-up; Kg/m<sup>2</sup> = kilogram per meter squared; N = Sample Size; NR = Not Reported; NS = Not Significant; P = P-value; PEEP = Physical Education Enrichment Program; SD = Standard Deviation; SE = Sample Error; WASPAN = West Australian Schools Physical Activity and Nutrition Project

**Evidence Table 12b. Weight related outcomes for combined diet and physical activity intervention studies taking place in a school setting with a home component, subgroups**

Author, year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of Association
<b>BMI change</b>																	
Hendy, 2011 <sup>9</sup>	1	Over-weight children	59	94	14	59	92	-2.0	26	53	94	1.5					Tcorr: 3.49 P= 0.001
	2		53	94	14	53	91.4	-2.6	26	45	94						
	1	Average weight children	98	56	14	98	54	-2.0	26	92	56	1.5					Tcorr: 2.16 P=0.032
	2		102	56	14	102	53.6	-2.4	26	94	55						
<b>BMI, z score</b>																	
Hollar, 2010 <sup>11</sup>	1	Boys	NR	0.77 (1.19)	34	NR	0.89 (0.99)		68	NR	0.85 (1.09)		0.87 (1.06)				
	2		NR	0.73 (1.20)	34	NR	0.65 (1.22)		68	NR	0.78 (1.09)		0.72 (1.13)				
	1	Girls	NR	0.78 (0.98)	34	NR	0.70 (1.02)		68	NR	0.74 (1.08)		0.78 (1.04)				
	2		NR	0.57 (1.19)	34	NR	0.51 (1.17)		68	NR	0.63 (1.10)		0.54 (1.12)				
<b>Weight, z score</b>																	
Hollar, 2010 <sup>11</sup>	1	Boys	NR	0.68 (1.19)	34	NR	0.76 (1.14)		68	NR	0.72 (1.16)		0.72 (1.16)				
	2		NR	0.74 (1.14)	34	NR	0.72 (1.13)		68	NR	0.68 (1.14)		0.68 (1.13)				
	1	Girls	NR	0.71 (1.03)	34	NR	0.68 (1.11)		68	NR	0.65 (1.13)		0.68 (1.12)				

Author, year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of Association
	2		NR	0.56(1.13)	34	NR	0.55(1.11)		68	NR	0.53(1.11)		0.5(1.10)				

N = Sample Size; NR = Not Reported; SD = Standard Deviation; Tcorr = t-test correlation coefficient

**Evidence Table 12c. Intermediate related outcomes for combination diet and physical activity intervention studies taking place in a school setting with a home component, subgroups**

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
<b>Change in Physical Activity</b>									
<b>Motion Sensor (average vector magnitude/ min)</b>									
Caballero, 2003 <sup>2</sup>	1—control	278 total	303.13	156	278 total	246.79		20.43 mins.	P = 0.310
	2—intervention		282.04			267.22			
<b>Time spent in M to V PA (goal ≥ 50%), percent</b>									
Coleman, 2005 <sup>3</sup>	1—control	473	38	104	744 total	63		5.0%	NS
	2—intervention	423	30			60			
<b>Time spent in vigorous PA (goal ≥ 20%), percent</b>									
Coleman, 2005 <sup>3</sup>	1—control	473	11	104	744 total	10		3.0%	P < 0.05
	2—intervention	423	10			12			
<b>Minutes of MV PA per day</b>									
Dzewaltowski, 2010 <sup>6</sup>	1—control	112	NR	104	112	NR		5.92 minutes	P < 0.05
	2—intervention	134	NR		134	NR			
<b>Exercise frequency (% ≥ 7 times per week)</b>									
Fitzgibbon, 2006 <sup>36</sup>	1—control	170	22.4 (NR)	104	139	17.82 (4.32)		10.8% (-2.56-24.12) (adjusted for baseline value and Head Start site)	NS
	2—intervention	180	26.7 (NR)		154	28.60 (4.13)			
<b>Exercise intensity (Borg scale)</b>									
Fitzgibbon, 2006 <sup>36</sup>	1—control	169	3.4 (2.5)	104	139	4.62 (0.16)		-0.30 (-0.79-0.19) (adjusted for baseline value and Head Start site)	NS
	2—intervention	180	3.7 (2.9)		154	4.32 (0.15)			
<b>Total PA in hour/wk</b>									
Foster, 2008 <sup>7</sup>	1—control	600	25.17	104	335	20.62	-4.55	0.30 hours/week (adjusted difference (95% CI: -	P = 0.40

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
	2—intervention	749	25.03		416	21.28	-3.75	0.40-1.00) b/w intervention and control adjusted for race/ethnicity, gender, age, randomization pair, weight status at baseline and baseline measures of the dependent variable)	
<b>Number of steps per day (per participant)</b>									
Gorely, 2009 <sup>37</sup>	1—control	279	10163.49 (2888.82)	43 (10 months)	243	NR		+1631 steps (intervention vs. control)	P = 0.001
	2—intervention	310	9579.42 (2735.64)		264	NR			
<b>Minutes of Moderate to Vigorous PA/day</b>									
Gorely, 2009 <sup>37</sup>	1—control	279	120.32 (23.67)	43	243	NR		+20.0 minutes/day	P<0.0001
	2—intervention	310	124.72 (26.70)		264	NR			
<b>Bouts of Moderate to Vigorous PA (mins/day) – where only count “bouts” or periods of 1min+ PA</b>									
Gorely, 2009 <sup>37</sup>	1—control	279	36.51 (16.37)	43	243	NR		+16 minutes/day	P<0.0001
	2—intervention	310	40.09 (18.73)		264	NR			
<b>Number of steps per month PER GROUP</b>									
Hendy, 2011 <sup>9</sup>	1—control	189	NR	3 months (? Weeks)	189	NR	+11,971 steps/month		P<0.008, - significant study phase x study group interaction effect - found by ANOVA
	2—intervention	193	NR		193	NR	+758 steps/month		
<b>Hours of MVPA per week (outside of school)</b>									
Manios, 1998 <sup>15</sup>	1—control	149 <sup>a</sup>	1.4 (2.2)	156	149	1.9 (2.6)	0.4 (2.6) <sup>b</sup> Adjusted for sex, weight and height.	1.6 minutes (=2.0-0.4)	P < 0.005
	2—intervention	199 <sup>a</sup>	0.9 (2.0)		199	2.8 (3.2)	2.0 (3.6) <sup>b</sup>		

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
							Adjusted for sex, weight and height.		
<b>Total PA, 2000-2100 hours (counts per min)</b>									
Marcus, 2009 <sup>16</sup>	1—control	640	NR	Between April 2002 and June 2005 – so range between 156 weeks to 164?	640	771 (sd =163)		18 cpm (NR in the text but can be manually calculated)	P = 0.055, adjusted for calendar year, gender and age (p-value cluster, P = 0.10, cluster analysis where school and month were included as random factors in ANCOVA)
	2—intervention	653	NR		653	789 (sd=161)			
<b>Total PA, mins</b>									
Nader, 1999 <sup>18</sup>	1—control	1400	163.2 (3.1)	156	1400	125.4 (2.6)	-37.8	6.9	P = 0.02, reject H <sub>0</sub> that I-C=0 at baseline, also p+0.04, reject H <sub>0</sub> that I-C=0 at end of f/u
	2—intervention	1996	152.0 (2.5)		1996	121.1 (2.1)	-30.9		
<b>Minutes of vigorous PA, min</b>									
Nader, 1999 <sup>18</sup>	1—control	1400	45.5 (1.9)	156	1400	22.1 (1.4)	-23.4	-5.6	P = 0.001, reject Ho that I-C=0 at baseline, also p+0.001, reject Ho that I-C=0 at end of f/u.
	2—intervention	1996	59.2 (1.9)		1996	30.2 (1.3)	-29.0		
<b>Percent engaged in at least 30 mins VPA per day (asked about previous day)</b>									
Hoelscher, 2010 <sup>10b</sup>	1—active control (CATCH BasicPlus)	554 students at 15 active control schools	74.2 (se=0.02)	52	691 students at 15 active control schools	76.6 (se=0.02), adjusting for sex, age, ethnicity, % economically	2.4 (P = 0.17)	-0.6%	P = 0.421

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
						disadvantaged, and school district; school is entered as random effect			
	2-CATCH Basic Plus + Community	553 students at 15 intervention schools	71.0 (se=0.02)		471 students at 15 intervention schools	72.8 (se=0.02), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	1.8 (P = 0.27)		
Number of days engaged in at least 30 mins VPA (as assessed over past week)									
Hoelscher, 2010 <sup>10b</sup>	1—active control (CATCH BasicPlus)	554	4.3 (se=0.12)	52	691	4.2 (se=0.11), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random	-0.1 (P = 0.33)	0.3	P = 0.111



Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
	2-CATCH Basic Plus + Community	553	4.0 (se=0.12)		471	4.2 (se=0.12), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	0.2 (P = 0.11)		
Number of days played outdoors (as assessed over past week)									
Hoelscher, 2010 <sup>10b</sup>	1—active control (CATCH BasicPlus)	554	3.9 (se=0.12)	52	691	4.1 (se=0.11), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	0.2 (P = 0.10)* (sig at P = <0.05 level, 1-tailed)	0.1	P = 0.251
	2-CATCH Basic Plus + Community	553	3.8 (se=0.12)		471	4.1 (se=0.13), adjusting for sex, age, ethnicity, % economically disadvantaged	0.3 (P = 0.020)** (sig at P = <0.01 level, 1-tailed)		

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
						ed, and school district; school is entered as random effect			
Number of days played sports activity (as assessed over past week)									
Hoelscher, 2010 <sup>10b</sup>	1—active control (CATCH BasicPlus)	554	3.3 (se=0.11)	52	691	3.4 (se=0.10), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	0.1 (p=0.29)	0.2	P = 0.110
	2-CATCH Basic Plus + Community	553	3.2 (se=0.11)		471	3.5 (se=0.12), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	0.3 (P = 0015)** (sig at P = <0.01 level, 1-tailed)		

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
<b>Number of days participated in some organized PA (as assessed over past week)</b>									
Hoelscher, 2010 <sup>10b</sup>	1—active control (CATCH BasicPlus)	554	1.4 (se=0.09)	52	691	1.7 (se=0.09), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	0.3 (P = 0.010)** (sig at P = <0.01 level, 1-tailed)	-0.1	P = 0.305
	2-CATCH Basic Plus + Community	553	1.4 (se=0.09)		471	1.6 (se=0.1), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	0.2 (P = 0.08)* (sig at P = <0.05 level, 1-tailed)		
<b>Average daily pedometer steps (post-pre)</b>									
Schetzina, 2009 <sup>20</sup>	2- intervention only	114	3301 (1107)	78	48	4187 (1578)	886 steps		P < 0.001
<b>Leisure time out of school physical activity (h/week) –</b>									

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
defined as at least equivalent to moderate walking speed and lasting at least 5 minutes monitored by 7-day diaries									
Burke, 1998 <sup>1</sup> (girls only)	1—control	391 girls total	NR	26 weeks post intervention	720 children total (boys and girls)	NR			Ns
	2—WASPAN		NR			NR			
	3--PEEP		NR			NR			
Burke, 1998 <sup>1</sup> (boys only)	1—Control	409 boys total	NR	26 weeks post intervention		NR			NS
	2—WASPAN		NR			NR			
	3--PEEP		NR			NR			
Change in Sedentary Behavior									
TV Watching (min/week)									
Burke, 1998 <sup>1</sup> (girls only)	1—control	391 girls total	NR	26 weeks post intervention	720 children total (boys and girls)	NR	4.8 (95% CI: -15.5, 25.0)		NS
	2—WASPAN		NR			NR	-8.5 (95% CI: -31.2, 14.2)		
	3--PEEP		NR			NR	2.0 (95% CI: 18.1, 22.1)		
Burke, 1998 <sup>1</sup> (boys only)	1—Control	409 boys total	NR	26 weeks post intervention		NR	22.8 (95%CI: -2.6, 48.2)		P = 0.014 for PEEP
	2—WASPAN		NR			NR	7.0 (95%CI: -18.1, 32.2)		
	3--PEEP		NR			NR	-17.7 (95%CI: -38.2, 2.9)		
Average total TV									

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
<b>viewing, hours per day – no particular day of the week, parent reported</b>									
Fitzgibbon, 2006 <sup>36</sup>	1—control	170	2.6 (1.5)	104	139	2.34 (0.12)	-0.26	-0.2; or from Table – 0.00 h/day (-0.38 to 0.38) (adjusted for baseline value and Head Start site)	NS
	2—intervention	180	2.8 (1.6)		154	2.34 (0.12)	-0.46		
<b>Total TV, hours per weekday</b>									
Foster, 2008 <sup>7</sup>	1—control	600	2.81	104	315	3.02	0.21	1.00	P<0.001
	2—intervention	749	2.92		390	2.89	-0.03	0.95 (0.93-0.98) adjusted difference b/w intervention and control adjusted for race/ethnicity, gender, age, randomization pair, weight status at baseline and baseline measures of the dependent variable; should be interpreted as OR	
<b>Total TV, hours per weekend</b>									
Foster, 2008 <sup>7</sup>	1—control	600	3.41	104	300	3.32	-0.09	1.00	P = 0.39
	2—intervention	749	3.28		372	3.26	-0.02	0.97 (0.89-1.05) b/w intervention and control adjusted for race/ethnicity, gender, age, randomization pair, weight status at baseline and baseline measures of the dependent variable; should be interpreted as OR	
<b>Total Inactivity, h/wk</b>									
Foster, 2008 <sup>7</sup>	1—control	600	105.45	104	210	108.93	3.48	1.00	P = 0.005
	2—intervention	749	115.21		269	104.42	-10.79	0.96 (0.94-0.99) b/w intervention and control adjusted for race/ethnicity, gender, age, randomization pair, weight status at baseline and baseline measures of the dependent variable; should be interpreted as OR	
<b>% who watched &gt;2 hrs TV/day (asked about the previous day)</b>									
Hoelscher, 2010 <sup>10</sup>	1—active control (CATCH BasicPlus)	554 students at 15 active	22.0 (se=0.02)	52	691 students at 15 active control	29.1 (se=0.03), adjusting for sex, age,	7.1 (P = 0.0002)** (sig at P < =0.01 level, 1-tailed)	-4.7%	P = 0.095 * sig at P < =0.05 level, 1-tailed

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
		control schools			schools	ethnicity, % economically disadvantaged, and school district; school is entered as random effect			
	2-CATCH Basic Plus + Community	553 students at 15 intervention schools	25.9 (se=0.03)		471 students at 15 intervention schools	28.3 (se=0.03), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	2.4 (P = 0.20)		
% who spent >2 hrs on the computer/day (asked about the previous day)									
Hoelscher, 2010 <sup>10</sup>	1—active control (CATCH BasicPlus)	554	4.5 (se=0.01)	52	691	8.3 (se=0.01), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is	3.8 (P = 0.002)** (sig at P < =0.01 level, 1-tailed)	-5.6%	P = 0.003 ** sig at P < =0.01 level, 1-tailed

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
						entered as random effect			
	2-CATCH Basic Plus + Community	553	8.2 (se=0.02)		471	6.4 (se=0.01), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect.	-1.8 (P = 0.14)		
% who played >2 hrs of video games/day (asked about the previous day)									
Hoelscher, 2010 <sup>10</sup>	1—active control (CATCH BasicPlus)	554	5.9 (se=0.01)	52	691	8.9 (se=0.01), adjusting for sex, age, ethnicity, % economically disadvantaged, and school district; school is entered as random effect	3.0 (P = 0.010)** (sig at P < =0.01 level, 1-tailed)	-1.3%	P = 0.182
	2-CATCH Basic Plus + Community	553	8.4 (se=0.01)		471	10.1 (se=0.02), adjusting for sex, age,	1.7 (P = 0.15)		

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
						ethnicity, % economically disadvantaged, and school district; school is entered as random effect			
Change in fruit and vegetable intake									
Number of fruits and vegetables per day									
Foster, 2008 <sup>7</sup>	1—control	600	5.33	104	333	4.28	-1.05	-0.04 (-0.37-0.30)	P = 0.82
	2—intervention	749	5.26		441	4.17	-1.09		
Fruit and vegetable intake									
Gorely, 2009 <sup>37</sup>	1—control	279	NR	43	243	NR	NR	NR	P = 0.413
	2—intervention	310	NR		264	NR	NR		
Fruits and vegetables first behavior									
Hendy, 2011 <sup>9</sup>	1—control	189	NR	52	NR	NR	.72	1.59 meals ( of 6 meals)	P = 0.000
	2—intervention	193	NR		NR	NR	2.31		
Number of fruits and vegetables per day									
Hoelscher, 2010 <sup>10a</sup>	1—control	554	4.0	52	NR	3.8	0.1	0.3	P = 0.074
	2—intervention	553	4.1		NR	4.2	0.4		
Consumption of fruits and vegetables									
Marcus, 2009 <sup>16</sup>	1—control	1465	NR	208	NR	NR	NR	NR	P = 0.47
	2—intervention	1670	NR		NR	NR			
Portions of vegetables									



Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	(I-C) Difference of the difference	Measure of Association
<b>consumed per week: <math>\approx \frac{1}{2}</math> to 1 cup</b>									
Mihas, 2010 <sup>17</sup>	1—control	93	2.0			2.2	0.2	-0.1	NS
	2—intervention	98	2.1			2.2	0.1		
<b>Portions of fruit consumed per week: <math>\approx \frac{1}{2}</math> to 1 cup</b>									
Mihas, 2010 <sup>17</sup>	1—control	93	4.8			4.9	0.1	1.0	NS
	2—intervention	98	4.7			5.8	1.1		
<b>Change in Energy Intake</b>									
<b>Number of kilocalories</b>									
Caballero, 2003 <sup>2</sup> (24 h dietary recall)	1—control	278 total	NR	156	278 total	2157		-265.0 Calculated from mean values at follow-up (intervention-control)	P = 0.003
	2—intervention		NR			1892			
Caballero, 2003 <sup>2</sup> (school lunch observation)	1—control	278 total	573.6	156	278 total	494.4		5.8*	P = 0.804
	2—intervention		522.9			500.2			
Foster, 2008 <sup>7</sup>	1—control	600	129000.59	104	331	10154.13	-2764.46	-104.27	P = 0.12
	2—intervention	749	13764.37		437	10019.10	-3745.26		
Hatzis, 2010 <sup>8</sup>	1—control	93	1843	520	93	2066	222	299	P = 0.027
	2—intervention	80	1845		80	2386	541		
Hopper, 2005 <sup>12</sup>	1—control	96	1698.34	86	96	1686.25	-12.09	-58.9	NS
	2—intervention	142	1657.13		142	1586.15	-70.98		
Lionis, 1991 <sup>14</sup>	1—control	29	2074.6	39	29	NR	162.7	-18.0	NS
	2—intervention	39	2160.7		39	NR	144.7		
Mihas, 2010 <sup>17</sup>	1—control	93	8583.7	52	93	8757.9	174.2	-565.10	P < 0.05
	2—intervention	98	8503.3		98	8112.4	-390.9		
Nader, 1999 <sup>18</sup>	1—control	2117	8435	156	2117	9364	929	-235.0	P = 0.13
	2—intervention	2989	8544		2989	9238	694		

ANCOVA = Analysis of Covariance; ANOVA = Analysis of Variance; b/w = Between; CATCH = Coordinated Approach to Child Health Basic Plus; CI = Confidence Interval; F/U =Follow-up; Ho = Null Hypothesis; I-C = Difference between intervention and control; MVPA = Moderate to Vigorous Physical Activity; M to V = Moderate to Vigorous; N = Sample Size; NR = Not Reported; NS = Not Significant; OR = Odds Ratio; P = P-value; PA = Physical Activity; PEEP = Physical Education Enrichment Program; SD = Standard Deviation; SE =Sample Error; Sig = Significant; VPA = Vigorous Physical Activity; WASPAN = West Australian Schools Physical Activity and Nutrition Project

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# Key Question 1. School-home-community based.

Evidence Table 13. Study characteristics for studies taking place in a school setting with home and community components

Author, year	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Angelopoulos, 2009 <sup>1</sup> Greece	NR	Randomized intervention	NR	No/Not reported	From the total number of primary schools in the region (Ioannina Metropolitan Area, Greece), a random sample of 26 schools was selected.
De Coen, 2012 <sup>2</sup> Belgium	2008-2008	Randomized intervention	Age: 3-6 years old,  Grade: All children in pre-primary school (3-5yrs) and in the first year of primary school (6yrs).	Yes	
de Meij, 2010 <sup>3</sup> Netherlands	2006-2008	Non-randomized intervention	Grade: 3-8 Recruited schools needed to have: (1) a certified PE teacher; (2) a majority of pupils with low socio-economic status; and (3) a gymnasium, either in the school or in the direct vicinity of the school.	No/Not reported	The stepwise development of JUMP-in has been described previously, including the pilot outcomes, the program components and strategies, and hypothesized working mechanisms:  (Evaluation of the JUMP-In Pilot 2002–2004: Effect- and Process Evaluation Study of an Intervention Promoting Physical Activity among School Children). Amsterdam: GGD Amsterdam, 2005.  Jurg ME, Kremers SP, Candel MJ, et al. A controlled trial of a school-based environmental intervention to improve physical activity in Dutch children: JUMP-in, kids in motion. Health Promot Int 2006;2:320–30.  Jurg ME, De Meij JS, Van der Wal MF, et al. Using health promotion outcomes informative evaluation studies to predict success factors in interventions: an application to an intervention for promoting physical activity in Dutch children (JUMP-in). Health Promot Int 2008;23:231–9.
Greening, 2011 <sup>4</sup> US	NR	Randomized intervention	The ability to comprehend the questionnaires and perform the fitness tests.	Yes	
Jansen, 2011 <sup>5</sup> The Netherlands	2006-2006	Randomized intervention	Grade: 3-8	No/Not reported	
Sanigorski, 2008 <sup>6</sup> Australia	NR	Non-randomized intervention	NR	Yes	Primary schools (n=6, age 5-12 years) in Colac (Australia) with >=20 enrolled students were included in the sample frame  The town of Colac was purposively selected as the intervention site as it had

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
					not been previously engaged in similar community-based projects, it was geographically contained and it had good infrastructure and community networks to support the intervention program
Millar, 2011 <sup>7</sup> Australia	2005-2006	quasi- experimental	Age: 12-18  Grade: Secondary school students	Yes	
Naul, 2012 <sup>8</sup> Germany and Netherlands	NR	Natural experiment	Not Reported	Yes	
Tomlin, 2012 <sup>9</sup> Canada	NR	Natural experiment	Grades 4-12	Yes	

NR = Not Reported; PE = Physical Education; US = United States

**Evidence Table 14. Participant characteristics for studies taking place in a school setting with home and community components**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Angelopoulos, 2009 <sup>1</sup>	646	65-73 weeks	Overall: 360 Arm1: 176 Arm2: 184	Arm1: 10.29 (0.44)  Arm2: 10.25 (0.44)	NR	5th grade Overall: 646 Arm 1: 321 Arm 2: 325	Note: Baseline was 1 to 2 months before intervention started. Social and demographic characteristics reported included School Region (Urban vs. Rural) Nationality (Greek vs. Immigrants), Parental Educational level, and Maternal Educational level, but there were no significant differences between the intervention and control groups.
de Meij, 2010 <sup>3</sup>	2829	34-86 weeks	Overall:1404 (49.6) Arm1: 698 (49.7) Arm2: 706 (50.3)	Arm1: Boys=8.6 (1.8) Girls=8.5 (1.8)  Arm2: Boys=8.6 (1.9) Girls=8.5 (1.9)	Dutch Overall: NR Arm 1: (18.5) Arm 2: (10.2)  Moroccan Overall: NR Arm 1: (31.6) Arm 2: (30.0)  Turkish, Surinam, Western-other, Non-western other Overall: NR Arm 1: (49.9) Arm 2: (59.7)	NR	At baseline, there was a significant difference in waist circumference for intervention girls compared to control girls (62.1 (9.4) compared to 61.0 (8.5), respectively P=0.05).
Greening, 2011 <sup>4</sup>	450	34 weeks	Overall: (48)	Overall: 8.34 (1.30) Range: 6-10	White, non-Hispanic Arm 1: 37 Arm 2: 42  Black, non-Hispanic Arm 1: (63) Arm 2: (58)	NR	Schools and not individuals were randomized to the two Arms  The participating schools were the only two schools in their respective communities, precluding testing additional schools in the community.
Jansen, 2011 <sup>5</sup>	2622	39 weeks	They reported sex by grade.  For grades 3-5: Arm 1: (51) Arm 2: (50.5)  For grades 6-8: Arm 1: (49) Arm 2: (47.2)	NR		Grades 3-5 Arm 1: 729 Arm 2: 657  Grades 6-8 Arm 1: 653 Arm 2: 583	
Sanigorski, 2008 <sup>6</sup>	NR	NR	Arm1: (53.6)	Arm1: 8.34 (2.22)		NR	Height significantly differed (P=0.01) between the two

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
		The study says that children were measured in 2003/2004 (baseline) and again in 2006 (follow-up). The follow-up time can only be extrapolated from this as we do not have a good idea of when the measurements took place in 2003 and 2006.	Arm2: (50.2)	Arm2: 8.21 (2.26)			<p>groups: 130.5 cm vs. 128.9 cm for Arm 1 (control) vs. Arm 2 (intervention), respectively.</p> <p>Data reported in the form above are only for children who consented to data collection, not the total number who participated.</p> <p>For Arm 1 (control), a total of 2687 were originally allocated to the control group but data reported here are for the 1183 who consented to data collection. 974 were analyzed (follow-up).</p> <p>For Arm 2, a total of 1726 children were originally allocated to the intervention group, but only 1001 consented to data collection. 883 were analyzed (follow-up).</p> <p>Baseline age and gender were reported for the entire baseline sample (1183 in arm 1 and 1001 in arm2). For those continued in follow-up, age is 10.31(2.14) and 11.13 (2.17) in arm 1 and arm 2; % girl is 49.1% and 53.7% in arm 1 and 2.</p> <p>Please note that the study does report the education level and SES of the parents.</p>
Millar, 2011 <sup>7</sup>	2054	NR	Overall: (46.5)	Overall:14.6 (1.42)	NR	NR	
Naul, 2012 <sup>8</sup>	557	208 weeks	NR	NR	NR	NR	The data was divided into 261 participants from Germany and 296 from the Netherlands.
De Coen, 2012 <sup>2</sup>	3241	104 weeks	Overall:50 Arm1:54.7 Arm2:47.1	NR	NR	NR	
Tomlin, 2012 <sup>9</sup>	148	28 weeks	NR	NR	NR	NR	

Cm = Centimeters; N = Sample Size; NR = Not Reported; P = P-value; SD = Standard Deviation; SES = Social-Economic Status

**Evidence Table 15. Description of the interventions used in school settings with home and community components**



Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Angelopoulos, 2009 <sup>1</sup>	2	<p>The intervention consisted of a student workbook and teacher manual which covered themes related to self-esteem, body image, nutrition, physical activity, fitness and environmental issues.</p> <p>Length of intervention, weeks: 52</p> <p>Setting: School: Implemen-tation of a school-based curriculum. Home: Increasing parental involvement by increasing the availability of fruits and vegetables at home. Community or environment-</p>	<p>An intervention material (student's workbook and teacher's manual) was developed and integrated into the existing school curriculum. The themes covered included self-esteem, body image, nutrition, physical activity, fitness and environmental issues.</p> <p>Several motivational methods and strategies were used for increasing knowledge (i.e. discussion, active learning, cues), increasing skills and self-efficacy (i.e. modeling, guided practice, enactment), achieving better self-monitoring (i.e. problem solving, goal setting), changing attitudes</p>	<p>The intervention focused on increasing parental involvement and availability of fruits and vegetables at home and school.</p> <p>School canteens were also obliged to have fresh fruit and freshly made juices.</p> <p>Fruit or vegetable bazaars were organized to increase familiarity and to provide parental and peer support for their consumption.</p> <p>Target: Child Parent/Caregiver Family</p> <p>Delivery: Teacher</p>	<p>An intervention material (student's workbook and teacher's manual) was developed and integrated into the existing school curriculum. The themes covered included self-esteem, body image, nutrition, physical activity, fitness and environmental issues.</p> <p>Several motivational methods and strategies were used for increasing knowledge (i.e. discussion, active learning, cues), increasing skills and self-efficacy (i.e. modeling, guided practice, enactment), achieving better self-monitoring (i.e. problem solving, goal setting), changing attitudes and beliefs (i.e. self re-evaluation, environmental re-evaluation, arguments, modeling,</p>	<p>Physical activity sessions, delivered in the playground, aimed at increasing children's fun and excitement for exercise. The sessions were enjoyable, fitness-oriented (rather than motor-oriented) and of moderate intensity. Little attention was placed on competition and winning while verbal rewards were given for all levels of effort and ability</p> <p>Apart from these sessions, playgrounds and school yards were accessible for children to play after the end of the curricular program, thus eliminating the factor mainly perceived as restrictive towards engagement in physical activity.</p> <p>Target: Child</p> <p>Delivery: Teacher Duration: 45 minutes per session.</p>			<p>The intervention group included monthly family events alternated between nutrition and physical activity/contests</p> <p>For the intervention group, teachers and mothers participated in recipe selections, food preparations, and in the activities with the students. Health providers (e.g., dietitians) and educators from the Department of Education organized and facilitated participation in the nutritional and physical activity events in collaboration with the elementary school and the school's faculty.</p>

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		level: Playgrounds and school yards were made accessible for children to play in.	<p>and beliefs (i.e. self re-evaluation, environmental re-evaluation, arguments, modeling, direct experience) and changing social influence (i.e. modeling, mobilizing social support).</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration/frequency: 1-2 hours per week</p>		<p>direct experience) and changing social influence (i.e. modeling, mobilizing social support).</p> <p>In addition, parental support was achieved via meetings at which parents were given a file containing the results of their child's medical and nutritional assessment. Additionally, parents were advised to support their children in being physically active rather than to encourage sedentary behaviors. Some of the motivational methods used during these meetings were provision of feedback, reinforcement, discussion, persuasive communication, loss/gain frame.</p> <p>Target: Child Parent/Caregiver</p> <p>Delivery: Teacher</p>	Frequency: 2 sessions per week. Total of 60 classes per year			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
					Duration: 1-2 hours per week				
de Meij, 2010 <sup>3</sup>	2	<p>JUMP-in</p> <p>Length of intervention, weeks: 73 weeks (8 months year 1 and 9 months year 2)</p> <p>Setting: School, Home, Community or environment-level</p>			<p>Targeting child: 'The Class Moves!' Method (calendars) offering recurrent breaks for PA, relaxation and posture exercises, during regular lessons. For each grade, materials are adapted to the level of sensor–motor development. The aim is to make PA a daily habit, increase enjoyment of PA and contribute to a healthy sensor-motor development. (Not sure if this should be considered a psycho-social or environmental intervention).</p> <p>Targeting Parents: Parental information services Contains several options: information meetings, courses and sports activities for parents. To reach parents, multimedia instruments and a JUMP-in information movie are</p>	<p>School sports club: structural and easily accessible school sports activities are offered on a daily basis. During school hours, children get acquainted with a variety of sports. Subsequently, they can join the club during out-of-school hours. Existing local providers of physical activities and sports clubs are involved.</p> <p>A monitoring instrument yearly assessing and registering children's level of PA, body mass index and motor skills. PFS facilitates referral to tailored interventions in a structured way, e.g., motor remedial teaching, physiotherapy and youth healthcare.</p> <p>Extra care for children</p>	Pedometer	<p>Other: School involvement</p> <p>Target: Child Other: schools</p> <p>Delivery: Researcher Teacher</p> <p>Duration: To increase school involvement, each school was required to appoint a CATCH Committee and CATCH Champion to guide site-level implementation decisions. CATCH training sessions for team members from each school; booster PE training sessions; a CATCH coordination kit providing "how-to" implementation instructions; awards (\$2–5,000) for exemplary CATCH</p>	<p>The addition of a community partner to the school-based CATCH Committee to form a "CATCH Community Action" team. CATCH Community Action teams were asked to:</p> <p>(i) Conduct a self-assessment using the CDC School Health Index to identify priority areas of action.</p> <p>(ii) Attend three "Best Practices" workshops per year with all CATCH BPC schools; and (iii) select an activity each semester from a "CATCH Community Café" menu of evidence-based strategies for promoting PA and healthy eating in the school setting.</p>

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
					<p>developed. Personal approach of parents from high-risk children is facilitated by the PFS. Existing structures such as language courses or coffee meetings are used to maximize attendance.</p> <p>Targeting parents and children: 'This is your way to Move!' Personal workbooks for children and their parents, with assignments to perform in class and at home, and an instruction-book for the school staff. The method is especially aimed at raising awareness of the importance of PA for health and at improving self-efficacy, social support, self-regulation and planning skills, of both children and parents.</p> <p>Target: Child Parent/Caregiver</p>	<p>at risk: Children detected by the PFS who have motor and movement disabilities or who experience hampering factors in their PA behavior (such as overweight), receive additional adapted physical education lessons (Club Extra) or motor remedial teaching, given by a qualified teacher. If necessary, parents of overweight or obese children receive an invitation for consultation from the youth healthcare or hospital.</p> <p>Target: Child</p>		<p>implementation; teacher-led activity breaks, which consisted of structured time during the week for PA and health education, with activities adapted from the CATCH Kids Club; and social marketing strategies, which included morning messages, CATCH signage, and messages on school menus.</p>	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
					Delivery: Researcher Teacher				
Greening, 2011 <sup>4</sup>	2	<p>Monthly family events that alternated between nutrition and physical activities/contest. Health curriculum and intervention program</p> <p>Length of intervention, weeks: 34</p> <p>Setting: School: School-based (and for some components, also a family-based) intervention. Home : Family-based nutritional events (healthy tailgating recipe contest, supermarket sweep, health snack selection contest, holiday eating and activity log) and</p>	<p>Family- and school-based nutritional events on alternating months, including: (i) healthy tailgating recipe contest, (ii) supermarket sweep requiring parent and student to locate healthy, low-nonfat food ingredients for recipe (iii) healthy snack selection contest, and (iv) parent-child health holiday eating and activity log. Health education: Nutritional content of foods addressed in nutritional events. Portion sizes and eating in moderation addressed. Health benefits of the monthly physical activity events were provided during the</p>	<p>Replaced deep frying equipment with baking ovens.</p> <p>Target: Child</p> <p>Delivery: Other: Institution</p>	<p>Family- and school-based physical activity events on alternating months including: (i) parent-child football toss contest, (ii) parent-child holiday activity log, (iii) parent-child softball throw contest, and (iv) field day of various activities including rope jumping, hula hoops, baseball throws, foot races.</p> <p>Target: Child Parent/Caregiver Family</p> <p>Delivery: Teacher</p> <p>Duration: 34 weeks</p> <p>Frequency: Monthly</p>		<p>Target: Teacher Other: Family Delivery: Family- and school-based physical activity events on alternating months including: (i) parent-child football toss contest, (ii) parent-child holiday activity log, (iii) parent-child softball throw contest, and (iv) field day of various activities including rope jumping, hula hoops, baseball throws, foot races.</p>	<p>Goal setting</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Comment: Booster sessions were introduced to reach a sustained increase in water consumption by giving quantitative targets and feedback.</p>	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		physical activity events (football toss contest, holiday activity log, softball throw contest, field day of various activities, including jump rope, hula hoops, football throws, and races. Community or environment-level: The school replaced the deep frying equipment with baking ovens.	<p>activity.</p> <p>Target: Child, Parent/Caregiver, Family</p> <p>Delivery: Teacher Other: Health providers (e.g. dietitians and educators from the Department of Education.</p> <p>Duration: Duration (e.g., length of educational or counseling sessions): 34 weeks Frequency (e.g., number of sessions per week): Nutritional events were monthly</p> <p>Comment: Family and school-based nutritional events took place on alternating months.</p>						
Jansen, 2011 <sup>5</sup>	2	Lekker Fit!  Length of intervention,	A classroom component with three main lessons on healthy nutrition,		A classroom component with three main lessons on healthy nutrition, active	Implementation of 3 PE sessions a week by PE teacher for grades 3 through 8.	Target: Other: Local sports clubs		

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		<p>weeks: 39</p> <p>Setting: School : Intervention targets individual behaviors as well as school policies and curriculum</p> <p>Home : Parent Involvement (described in comments box)</p> <p>Community or environment-level : Local sports clubs were involved in providing some of the PE classes and PA activities outside of school hours.</p>	<p>active living and healthy lifestyle choices adapted for each grade. The lessons comprise a homework assignment, a theoretical part and a practical part, during which knowledge is applied in activities. The lessons finish with joint goal setting.</p> <p>Target: Child</p> <p>Delivery: Teacher</p>		<p>living and healthy lifestyle choices adapted for each grade. The lessons comprise a homework assignment, a theoretical part and a practical part, during which knowledge is applied in activities. The lessons finish with joint goal setting.</p> <p>Target: Child</p> <p>Delivery: Teacher</p>	<p>Target: Child</p> <p>Delivery: PE teacher</p> <p>Duration: 3</p>	<p>Delivery: Organization of additional sport and play activities outside school hours which could be attended on a volunteer basis.</p> <p>Other: Additional components included: administration of the Eurofit test, provision of scorecards, and the offer of individual counseling if needed; health promotion gathering for parents and local sports clubs.</p>		
Sanigorski, 2008 <sup>6</sup>	2	Community capacity-building program promoting	<p>[i] One-off class sessions conducted by dietitians</p> <p>ii] Interactive,</p>	<p>i] School-appointed dietitian for support</p> <p>ii] School nutrition policies (including</p>	Promotional materials (for example, balloons, stickers)	<p>i] After-school activities program</p> <p>ii] Be Active Arts program</p>	<p>Target: Key organizations * from Colac, Australia .</p>	<p>Other: Parent Meetings</p> <p>Target:</p>	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		<p>healthy eating, physical activity and healthy weight</p> <p>Length of intervention, weeks: 156</p> <p>Setting: School: e.g. school nutrition policies, dietitians, after-school PA programs, walking school buses Community or environment-level : e.g. community gardens, fruit shops displays.</p>	<p>glossy, children's newsletters (set of four 1600 copies of each newsletter distributed through the schools)</p> <p>iii] Teacher fliers (linking to children's newsletters)</p> <p>vii)Parent tips sheets (set of 10)</p> <p>iv] Healthy lunchbox tip sheets</p> <p>Target: Child Parent/Caregiver Family Educator Canteen staff</p> <p>Delivery: Dietician. Key organizations* from Colac, Australia.</p>	<p>policies around water, fruit breaks, canteens, fundraising)</p> <p>iii] Canteen menu changes; lunch pack (healthy combos in designed packaging; 549 sold during the pilot period and remaining packs, about 4000, provided to schools for ongoing use)</p> <p>iv] Taste tests of new canteen menu items</p> <p>v] Fresh taste program (Melbourne Markets)</p> <p>vi] Healthy breakfast days</p> <p>vii] Happy healthy families program (small groups, 6 weeks)</p> <p>vii] Community garden</p> <p>ix] Choice chips program (7 hot chip outlets in Colac)</p> <p>x] Fruit shop displays (3 shops involved)</p> <p>xi] Promotional materials (for example, balloons,</p>	<p>Target: Child</p> <p>Delivery: Key organizations* from Colac, Australia.</p>	<p>iii] Walking school buses</p> <p>iv] Walk to school days</p> <p>v] Sporting club coach training</p> <p>vi] Sporting club equipment</p> <p>vii] Two class sets of pedometers for rotation between schools</p> <p>Target: Child Educator</p> <p>Delivery: Key organizations* from Colac, Australia.</p>	<p>Delivery: A "screen time" intervention component intended to limit TV viewing time. Screen time strategies included:</p> <p>i] TV power-down week, including a 2-week curriculum</p> <p>ii] Interactive, glossy, children's newsletters (series of five 1600 copies of each distributed thorough the schools)</p> <p>iii] Teacher fliers (linking to children's newsletters).</p>	<p>Parent/Caregiver</p> <p>Delivery: Pediatrician and Dietitian</p> <p>Duration: At regular parent meetings, which occurred once a month for one hour per session for 10 months a year, the pediatrician and dietitian encouraged health dietary habits.</p>	



Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
				stickers)  Target: Child, Family, Educator  Delivery: Dietician. Key organizations* from Colac, Australia.					
Millar, 2011 <sup>f</sup>	2	It's Your Move Project  Length of Intervention (weeks): 156 wks. (3 yrs.)  Setting: School: Variety of strategies delivered in school setting	Use of social marketing to promote healthy beverages, healthy breakfasts, increased consumption of fruits and vegetables.  Target: Child  Delivery: School project officers and student ambassadors	Distributed refillable water bottles, changed water policies, installed new water fountains, removed soft drinks from vending machines, introduced soup days and vegetable days, labeled school food based on healthiness, provided recipe books  Target: Child  Delivery: School project officers and student ambassadors	Promoted active transport to and from school, increased participation in organized sports or other recreation, and provided education sessions regarding sports.  Target: Child  Delivery: School project officers and student ambassadors	Introduced "riding to school program", started lunchtime and other walking groups, planned sports-related excursions  Target: Child  Delivery: School project officers and student ambassadors		Intervention: Promoted acceptance of healthy body size and shape  Target: Child Comments: School project officers and student ambassadors, Frequency and duration not reported	The intervention also involved capacity building among school project officers and student ambassadors through trainings, increasing awareness of project messages, evaluation, and professional development for physical education teachers, canteen staff training, and parent information.
Naul, 2012 <sup>g</sup>	2	HCSC Intervention  Length of Intervention (weeks): 208  Setting: School: multi-component program involving PA, nutritional	Monitor and teach healthier eating habits, class lessons, cooking classes, "school fruit events"  Target: Child:  Delivery: Teacher  Frequency:			Enhanced PA sessions and physical education, activities offered by afternoon session sports clubs, "walking bus" commute to school.  Target: Child  Delivery: Teacher			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		lessons, etc. Home: Involvement of family, parents, and home life	1hr/week			Duration: 3hr/week in Germany, 2hr/week in Netherlands  Comments: ultimate goal to achieve 60-90 minutes of PA per day.			
De Coen, 2012 <sup>2</sup>	2	Intervention based on the socio-ecological model in health promotion programs. Multi-topic intervention specifically based on 'Nutrition and physical Activity Health Targets' of the Flemish Community.  Length of Intervention (weeks): 104  Setting: School: Focus in the classroom; emphasis on school PA and snack and beverage policy Home: The parents received a poster visualizing the target messages and containing short tips	Through education to promote changes in daily consumption of water and decreasing soft drinks consumption; increasing daily milk consumption; increasing daily consumption of vegetables and fruit; decreasing daily consumption of sweets and savoury snacks.  Target: Child, Parent/Caregiver, Educator  Delivery: Researcher Teacher  Duration: implement five Healthy Weeks per intervention year (one for each cluster of topics) with a minimum 1 h		Through education to increase daily PA and decreasing screen-time behavior.  Target: Child  Delivery: Teacher  Comments: All intervention schools were requested to i) implement five Healthy Weeks per intervention year (one for each cluster of topics) with a minimum 1 h of classroom time dedicated to the topic together with extracurricular activities (e.g. during the vegetables and fruits week only fruits could be brought to school as a snack; schools organized fruit and vegetable tastings).	Development of an active playground and advice for parents to reduce screen-time behavior for their children  Target: Parent/Caregiver School Authority  Delivery: Researcher	Target: Child, Parent/Caregiver  Delivery: Teacher	Intervention: Community  Comments: Community organizations, members of the city council, aldermen and local non-profit organizations working with children or health topics were approached to support the intervention at community level, to raise awareness and give greater publicity to the project. Each intervention year, information brochures and posters regarding the five topics of the project were distributed through general practitioners, pharmacists, social services and at relevant community	

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		regarding parenting practices and styles to encourage children to stick to the healthy eating and PA targets Community: Each intervention year, information brochures and posters regarding the five topics of the project were distributed through general practitioners, pharmacists, social services and at relevant community events by the regional health boards and the research team.	of classroom time dedicated to the topic together with extracurricular activities  Frequency: NR					events by the regional health boards and the research team.	
Tomlin, 2012 <sup>9</sup>	2	ASIBC intervention  Length of Intervention (weeks): 28  Setting: School: classroom lessons on healthy eating and physical activity as well as	Integrated healthy eating education, focusing on fruit and vegetable consumption and a sugar sweetened beverage campaign  Target: Child  Delivery: Teacher,  Frequency: one			Increased physical activity sessions with recess and after-school activities and special class-room based PA sessions. In addition, extra playground equipment was provided  Target: Child  Delivery: Teacher			

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/enviromental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/enviromental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		extra PA sessions Home: Promote family events	healthy eating activity per month			Frequency: total 150 additional min of PA per week			

AS!BC = “Action Schools! British Columbia”; HCSC = “Healthy Children in Sound Communities”; Hr = Hours; NR = Not Reported; PA = Physical Activity; PFS = Pupil Follow-up System; Yrs = years; CATCH = “Coordinated Approach to Child Health”; CDC = Center for Disease Control; PE = Physical Education

**Evidence Table 16a. Weight-related outcomes for physical activity intervention studies taking place in a school setting with home and community component**

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>BMI, kg/m<sup>2</sup></b>																
de Meij, 2010 <sup>3</sup>	1	1451	18.1 (3.4)	34	1210	18.4 (3.5)	0.3	86	1099	18.8 (3.7)	0.7					Point Estimate: 0.07 95% CI: -0.02 to 0.16
	2	1378	18.2 (3.4)	34	1153	18.7 (3.6)	0.5	86	957	19.1 (3.7)	0.9					Point Estimate: 0.07 95% CI: -0.02 to 0.16
<b>Waist Circumference</b>																
de Meij, 2010 <sup>3</sup>	1	1451	61.6 (8.9)	34	1210	64.3 (9.7)	2.7	86	1099	64.9 (9.5)	3.3					Point Estimate: 0.3 95% CI: -0.15 to 0.75
	2	1378	62.3 (9.1)	34	1153	65.3 (10.7)	3.0	86	957	66.0 (10)	3.7					Point Estimate: 0.3 95% CI: -0.15 to 0.75

BMI = Body Mass Index; CI = Confidence Interval; N = Sample Size; SD = Standard Deviation

**Evidence Table 16b. Intermediate outcomes for physical activity intervention studies taking place in a school setting with home and community component**

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association	Notes
Organised sport (%)									
de Meij, 2010 <sup>3</sup>	1	68	37.7%	86 weeks	90	43.0%	NA	OR=2.8 (95%CI: 2.18 to 3.62)	Analysed using multilevel analysis, adjusted for values at T0 and T1, gender, age, BMI and ethnicity
	2	89	27.4%	86 weeks	94	65.8%	NA		
Physical activity (counts/min)									
de Meij, 2010 <sup>3</sup>	1	68	742 (252)	86 weeks	90	695 (232)	NA	b=40 (−27 to 106)	PA was measured in all children in grade 4 (n=351 mean age 7) using accelerometers. Analysed using multilevel analysis, adjusted for values at T0 and T1, gender, age, BMI and ethnicity
	2	89	707 (217)	86 weeks	94	715 (234)	NA		

BMI = Body Mass Index; N = Sample Size; NA = Not Applicable; OR = Odds Ratio; SD = Standard Deviation; T0 = Baseline; T1 = Follow-up 1

Evidence Table 17a. Weight related outcomes for combined diet and physical activity intervention studies taking place in a school setting with home and community components

Author, year	Arm	Base-line N	Baseline Measure, mean (SD)	First Follow-up Time-point in weeks	N at First Follow-up	First Follow-up Measure, mean (SD)	Mean Change from Base-line (SD)	Second Follow-up time-point in weeks	N Second Follow-up	Second Follow-up Measure, mean (SD)	Mean change from Base-line (SD)	Final Measure time-point	N at Final Measure	Final Follow-up measure, mean (SD)	Mean Change from Base-line (SD)	Measure of Association
BMI (Kg/m2)																
Angelopoulos, 2009 <sup>1</sup>	1	325	20.1 (3.4)	52		20.2 (3.2)	0.1 95% CI: -0.03 - 0.2									Point estimate: -1.2 P-value arm2 vs. arm 1: 0.047
	2	321	20.3 (3.6)	52		19.2 (2.9)	-1.1 95% CI: -1.2-0.9									Point estimate: -1.2 P-value arm 2 vs. arm 2: 0.047
Millar, 2011 <sup>7</sup>	1	778	21.6(3.5)									156	778	23.1(3.6)		Adjusted difference Point estimate: -0.22  P-value arm 2 vs. arm 2: 0.06
Millar, 2011 <sup>7</sup>	2	1276	Median (SD) =21.6, (3.8)										1276	23.0(4.1)		Adjusted difference Point estimate: -0.22 P-value arm 2 vs. arm 2: 0.06

Author, year	Arm	Base- line N	Baseline Measure, mean (SD)	First Follow- up Time- point in weeks	N at First Follow- up	First Follow-up Measure, mean (SD)	Mean Change from Base- line (SD)	Second Follow- up time- point in weeks	N Second Follow- up	Second Follow- up Measure, mean (SD)	Mean change from Base- line (SD)	Final Measure time- point	N at Final Measure	Final Follow- up measure, mean (SD)	Mean Change from Base- line (SD)	Measure of Association
Naul, 2012 <sup>8</sup>	2	296	16.3%	44	296	16.6%										Germany: F (1, 260) = 14,079, P < 0.001  Netherlands: F (1, 295) = 15,128 P < 0.001
<b>BMI (&lt;5th)</b>																
Greening, 2011 <sup>4</sup>	1	246	0%	34	246	0.41%										
<b>BMI (15th–85th)</b>																
Greening, 2011 <sup>4</sup>	1	246	47%	34	246	43%										
	2	204	46%	34	204	42%										
<b>BMI (85th–95th)</b>																
Greening, 2011 <sup>4</sup>	1	246	20%	34	246	19%										
	2	204	21%	34	204	24%										
<b>BMI (≥95th)</b>																
Greening, 2011 <sup>4</sup>	1	246	33%	34	246	38%										
	2	204	32%	34	204	32%										
<b>BMI z-score</b>																
Angelopoulos, 2009 <sup>1</sup>	1	325	0.83 (0.9)	52		0.67 (0.8)	-0.16 95% CI: -0.19 – -0.12									Point estimate – 0.3 P-value arm2 vs. arm 1: 0.074



Author, year	Arm	Base- line N	Baseline Measure, mean (SD)	First Follow- up Time- point in weeks	N at First Follow- up	First Follow-up Measure, mean (SD)	Mean Change from Base- line (SD)	Second Follow- up time- point in weeks	N Second Follow- up	Second Follow- up Measure, mean (SD)	Mean change from Base- line (SD)	Final Measure time- point	N at Final Measure	Final Follow- up measure, mean (SD)	Mean Change from Base- line (SD)	Measure of Association
	2	321	0.87 (0.9)	52		0.41 (0.9)	-0.46 95% CI: -0.50 – -0.42									Point estimate – 0.3 P-value arm2 vs. arm 1: 0.074
Millar, 2011 <sup>7</sup>	1	778	0.48(1.01)									156	778	0.53 (0.95)		Adjusted difference Point estimate: –0.07 P-value arm 2 vs. arm 2: 0.03
Millar, 2011 <sup>7</sup>	2	1276	Median (SD)= 0.52 (1.05)										1276	0.50 (1.05)		Adjusted difference Point estimate: –0.07 P-value arm 2 vs. arm 2: 0.03
De Coen, 2012 <sup>2</sup>	1	557	0.13 (0.92)	104	442	0.15 (0.89)										P-value = NS
De Coen, 2012 <sup>2</sup>	2	1032	Median (SD) = 0.12(0.95)		670	0.11 (1.03)										P-value = NS
Tomlin, 2012 <sup>9</sup>	1		NR													t-test = 1.066; P-value = 0.288
Tomlin, 2012 <sup>9</sup>	2	148	Median (SD) = 1.12, (0.86)	30	133	1.10(0.87);										
<b>Percent body fat</b>																
Greening, 2011 <sup>4</sup>	1	246	27.15%	34	246	27.55%										

Author, year	Arm	Base- line N	Baseline Measure, mean (SD)	First Follow- up Time- point in weeks	N at First Follow- up	First Follow-up Measure, mean (SD)	Mean Change from Base- line (SD)	Second Follow- up time- point in weeks	N Second Follow- up	Second Follow- up Measure, mean (SD)	Mean change from Base- line (SD)	Final Measure time- point	N at Final Measure	Final Follow- up measure, mean (SD)	Mean Change from Base- line (SD)	Measure of Association
	2	204	26.17%	34	204	25.61%										
		450														Point estimate: 5.56 [F(1,449)] P-value Grp2-G1 : 0.02
Millar, 2011 <sup>7</sup>	1	778	29.1% (9.2)									156	778	28.8% (10.4)		Adjusted difference Point estimate: – 0.23 P-value arm 2 vs. arm 2: 0.58
Millar, 2011 <sup>7</sup>	2	1276	Median (SD) =29.0%, (9.3)										1276	27.4% (10.3)		Adjusted difference Point estimate: –0.23  P-value arm 2 vs. arm 2: 0.58
<b>Body fat</b>																
Greening, 2011 <sup>4</sup>	1	246	27.15%	34s	246	27.55%										
	2	204	26.17%	34	204	25.61%										
<b>Weight</b>																
Millar, 2011 <sup>7</sup>	1	778	58.8 (12.7)									156	1276	67.0 (12.7)		NR

Author, year	Arm	Base- line N	Baseline Measure, mean (SD)	First Follow- up Time- point in weeks	N at First Follow- up	First Follow-up Measure, mean (SD)	Mean Change from Base- line (SD)	Second Follow- up time- point in weeks	N Second Follow- up	Second Follow- up Measure, mean (SD)	Mean change from Base- line (SD)	Final Measure time- point	N at Final Measure	Final Follow- up measure, mean (SD)	Mean Change from Base- line (SD)	Measure of Association
Millar, 2011 <sup>7</sup>	2	1276	Median (SD) =58.5, (13.2)											67.1 (14.0)		
<b>Pounds</b>																
Greening, 2011 <sup>4</sup>	1	246	27.77	34	246	28.93										
	2	204	26.55	34	204	27.61										
		450														Point estimate: 0.01 (1,449)  P-value Group 2 vs. Group 1: 0.92
<b>Percent Overweight/ Obese</b>																
Millar, 2011 <sup>7</sup>	1	778	27.1%									156	778	28.3		Adjusted difference Point estimate: -0.75 P-value arm 2 vs. arm 2: 0.12
Millar, 2011 <sup>7</sup>	2	1276	Median (SD) =30.2%										1276	27.3		Adjusted difference Point estimate: -0.75  P-value arm 2 vs. arm 2: 0.12

Author, year	Arm	Base- line N	Baseline Measure, mean (SD)	First Follow- up Time- point in weeks	N at First Follow- up	First Follow-up Measure, mean (SD)	Mean Change from Base- line (SD)	Second Follow- up time- point in weeks	N Second Follow- up	Second Follow- up Measure, mean (SD)	Mean change from Base- line (SD)	Final Measure time- point	N at Final Measure	Final Follow- up measure, mean (SD)	Mean Change from Base- line (SD)	Measure of Association
Tomlin, 2012 <sup>9</sup>	1															t-test = 0.818; p- value = 0.783
Tomlin, 2012 <sup>9</sup>	2	148	median (SD) =52.2%;	28	133	53.4%										
<b>Waist circumference, cm</b>																
Tomlin, 2012 <sup>9</sup>	1															t test=0.818; p=1
Tomlin, 2012 <sup>9</sup>	2	148	median (SD) =26.5%;	30	133	26.5%										
<b>Waist circumference, cm, z- score</b>																
Tomlin, 2012 <sup>9</sup>	1															t test=- 2.303; p=0.23
Tomlin, 2012 <sup>9</sup>	2	148	median (SD) =0.46, (1.07);	30	133	0.57(1.04)										

CI = Confidence Interval; Grp2-G1 = Group2 vs. Group 1; N = Sample Size; NR = Not Reported; NS = Not Significant; SD = Standard Deviation

Evidence Table 17b. Weight related outcomes for combined diet and physical activity intervention studies taking place in a school setting with home and community components, subgroups

Author, Year	Arm	Sub-group	Baseline N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from Base-line (SD)	Measure of Association
<b>BMI (Kg/m2)</b>																	
Jansen, 2011 <sup>5</sup>	1	Grades 3-5	729	17.07 (2.79)	34	729	17.57 (3.08)										
	2	Grades 3-5	657	17.07 (2.76)	34	657	17.49 (3)										
	1	Grades 6-8	653	19.06 (3.83)	34	653	19.77 (4.09)										
	2	Grades 6-8	583	19.60 (3.98)	34	583	20.36 (4.24)										
		Grades 3-5	1386														First follow-up regression coefficient: -0.10 (95% CI: -0.22-0.03)
		Grades 6-8	1236														First follow-up regression coefficient: -0.03 (95% CI -0.12-0.17)
<b>BMI, z-score</b>																	
De Coen, 2012 <sup>2</sup>	1	Low SES	8 Schools	0.12 (0.95)	104	260	0.16 (0.88)										Mean F test=0.04; p< 0.01

Author, Year	Arm	Sub-group	Baseline N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from Base-line (SD)	Measure of Association
De Coen, 2012 <sup>2</sup>	2	Low SES	8 Schools	Median (SD) =0.11, (0.92)		289	0.00 (1.11)										
De Coen, 2012 <sup>2</sup>	1	Med. SES	2 school participated	0.09 (0.89)	104	166	0.11 (0.83)										2 year intervention effects not significant.
De Coen, 2012 <sup>2</sup>	2	Med. SES	7 schools participate	Median (SD) =0.17, (0.88)		74	0.23(0.95)										
De Coen, 2012 <sup>2</sup>	1	High SES	556	0.18 (0.86)	104	108	0.15 (0.97)										2 year intervention effects not significant.
De Coen, 2012 <sup>2</sup>	2	High SES	1032	Median (SD) =0.09, (1.03)		215	0.17 (0.95)										
<b>Waist circumference (cm)</b>																	
Jansen, 2011 <sup>5</sup>	1	Grades 3-5	729	58.66 (8.05)	34	729	60.79 (8.7)										First follow-up regression coefficient: -1.29 (95% CI: -2.16--0.42)
	2	Grades 3-5	657	59.07 (7.95)	34	657	60.09 (8.58)										First follow-up regression coefficient: -0.71 (95% CI: -1.72 - 0.29)

Author, Year	Arm	Sub-group	Baseline N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from Base-line (SD)	Measure of Association
	1	Grades 6-8	653	67.34 (10.73)	34	653	70.77 (11.55)										
	2	Grades 6-8	583	69.03 (10.87)	34	583	71.81 (11.29)										
% Over-weight																	
Jansen, 2011 <sup>5</sup>	1	Grades 3-5	729	24.4	34	729	28.7										
	2	Grades 3-5	657	24.4	34	657	25.7										
	1	Grades 6-8	653	28.9	34	653	31.1										
	2	Grades 6-8	583	33.8	34	583	36.3										
		Grades 3-5	1386														First follow-up odds ratio: 0.53 (95% CI: 0.36-0.78)
		Grades 6-8	1236														First follow-up odds ratio: 1.25 (95% CI: 0.79-1.99)

BMI = Body Mass Index; CI = Confidence Interval; cm = centimeters Kg/m<sup>2</sup>: kilogram per meter squared; Med. = Medium; N = Sample Size; NR = Not Reported; NS = Not Significant; SD = Standard Deviation; SES = Socio-Economic Status

Evidence Table 17c. Clinical outcomes for combined diet and physical activity intervention studies taking place in a school setting with home and community components.

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
SBP								
Tomlin, 2012 <sup>9</sup>	1							NR
	2	148	0.85(0.80)	28	133	1.00(0.90)		
DBP								
Tomlin, 2012 <sup>9</sup>	1							NR
	2	148	0.10(0.67)	28	131	0.18(0.69)		
% Elevated BP								
Tomlin, 2012 <sup>9</sup>	1							NR
	2	148	30.3%	28	133	35.9%		

BP = Blood Pressure; DBP = Diastolic Blood Pressure; N = Sample Size; NR = Not Reported; SBP = Systolic Blood Pressure; SD = Standard Deviation



Evidence Table 17d. Intermediate outcomes for combined diet and physical activity intervention studies taking place in a school setting with home and community components.

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Calorie intake (Kcal/day)</b>								
Tomlin, 2012 <sup>9</sup>	1	NA	NA	NA	NA	NA	NA	
	2	115	1839.89 (761.5)	28	115	1730.29 (744.2)	NA	t=1.418, p=0.159
<b>Fruit intakes (exchange/day)</b>								
Angelopoulos, 2009 <sup>1</sup>	1	325	1.3 (1.5)	65-73	325	1.1 (1.6)	-0.2 (-0.4 to 0.1)	P=0.044
	2	321	1.1 (1.2)	65-73	321	1.5 (1.8)	0.4 (0.1 to 0.7)	
De Coen, 2012 <sup>2</sup>	1	557	135 (84.3)	104	442	139 (95.2)	NR	P=NS
	2	1032	142 (95.7)	104	670	151 (97.4)	NR	
Millar, 2011 <sup>7</sup>	1	778	56.9	156	778	56.3	0.9	P=0.51
	2	1276	58.0	156	1276	53.7		
Sanigorski, 2008 <sup>6</sup>	1	977	1.96 (1.32)	104-156	977	2.01 (1.48)	NR	NR
	2	835	1.90 (1.30)	104-156	835	2.20 (1.44)	NR	
Tomlin, 2012 <sup>9</sup>	1	NA	NA	NA	NA	NA	NA	
	2	115	1.44(1.77)	28	115	1.72 (2.61)	NA	t=-1.063, p=0.290
<b>Vegetable intakes (exchange/day)</b>								
Angelopoulos, 2009 <sup>1</sup>	1	325	1.1 (1.0)	65-73	325	1.2 (1.2)	0.0 (-0.16 to 0.22)	P=0.680
	2	321	1.2 (1.1)	65-73	321	1.0 (1.4)	-0.2 (-0.40 to 0.04)	
De Coen, 2012 <sup>2</sup>	1	557	73.2 (60.6)	104	442	83.3 (57.5)	NR	P=NS
	2	1032	81.8 (62.5)	104	670	91.2 (62.6)	NR	
Millar, 2011 <sup>7</sup>	1	778	81.4	156	778	81.4	0.77	P=0.14
	2	1276	76.3	156	1276	75.2		
Sanigorski, 2008 <sup>6</sup>	1	977	1.74 (1.44)	104-156	977	1.80 (1.65)	NR	NR
	2	835	1.83 (1.38)	104-156	835	2.03 (1.53)	NR	

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Tomlin, 2012 <sup>9</sup>	1	NA	NA	NA	NA	NA	NA	
	2	115	1.31 (1.7)	28	115	1.48 (1.55)	NA	t=-0.807, p=0.421
<b>Fatty food intakes</b>								
Tomlin, 2012 <sup>9</sup>	1	NA	NA	NA	NA	NA	NA	
	2	115	28.2 (9.0)	28	115	27.2 (9.1)	NA	t=0.931, p=0.354
Angelopoulos, 2009 <sup>1</sup>	1	325	8.7 (5.1)	65-73	325	9.4 (5.0)	0.7 (0.05 to 1.4)	P=0.028
	2	321	8.0 (4.7)	65-73	321	6.4 (3.8)	-1.6 (-2.4 to -0.9)	
Greening, 2011 <sup>4</sup>	1	246	54.21	34	246	53.63	NR	F=12.30,p=0.0005
	2	204	53.85	34	204	55.23	NR	
<b>Sugar-sweetened beverage intakes</b>								
Tomlin, 2012 <sup>9</sup>	1	NA	NA	NA	NA	NA	NA	
	2	115	835.4 (725.5)	28	115	927.2 (553.4)	NA	t=-1.423, p=0.158
De Coen, 2012 <sup>2</sup>	1	557	64.4 (100)	104	442	58.2 (86.1)	NR	P=NS
	2	1032	50.3 (86.1)	104	670	53.7 (90.8)	NR	
Millar, 2011 <sup>7</sup>	1	778	38.0	156	778	35.2	1.21	P=0.17
	2	1276	48.3	156	1276	44.4		
Angelopoulos, 2009 <sup>1</sup>	1	325	2.6 (2.7)	65-73	325	2.8 (3.2)	0.2 (-0.2 to 0.6)	P=0.039
	2	321	2.5 (2.2)	65-73	321	1.7 (2.2)	-0.8 (-1.3 to -0.4)	
Sanigorski, 2008 <sup>6</sup>	1	977	1.79 (1.64)	104-156	977	1.51 (1.44)	NR	NR
	2	835	2.07 (1.60)	104-156	835	1.52 (1.52)	NR	
<b>Physical activity</b>								
Greening, 2011 <sup>4</sup>	1	246	7.04	34	246	6.49	NR	F=4.56,p=0.04
	2	204	6.24	34	204	7.00	NR	
de Meij, 2010 <sup>3</sup>	1	1246	742 (252)	86	983	695 (232)	<b>40</b> (-27 to 106)	
	2	1197	707 (217)	86	841	715 (234)		
<b>Minutes of MVPA per day</b>								

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Angelopoulos, 2009 <sup>1</sup>	1	325	47.7 (41.9)	65-73	325	31.3 (23.6)	-16.4 (95%CI: -21.1 to -11.7)	P=0.041
	2	321	41.1 (36.6)	65-73	321	43.4 (27.2)	2.2 (-2.6 to 7.1)	
Tomlin, 2012 <sup>9</sup>	1	NA	NA	NA	NA	NA	NA	
	2	30	152.3 (36.2)	28	30	147.7 (45.5)	NA	t=-0.597, p=0.555
Participation in a sports club (h/week)								
De Coen, 2012 <sup>2</sup>	1	557	2.15 (1.86)	104	442	2.49 (2.27)	NR	P=NS
	2	1032	2.32 (2.38)	104	670	2.08 (1.66)	NR	
Participation in after-school sports activities (h/week)								
De Coen, 2012 <sup>2</sup>	1	557	2.09 (1.55)	104	442	1.58 (1.76)	NR	P=NS
	2	1032	2.05 (1.16)	104	670	1.48 (1.76)	NR	
Sanigorski, 2008 <sup>6</sup>	1	977	1.57 (1.49)	104-156	977	1.62 (1.23)	NR	NR
	2	835	1.07 (1.00)	104-156	835	1.71 (1.15)	NR	
Millar, 2011 <sup>7</sup>	1	778	79.0	156	778	82.3	0.67	P=0.001
	2	1276	72.7	156	1276	73.5		
Screen time (h/d)								
De Coen, 2012 <sup>2</sup>	1	557	1.3 (1.1)	104	442	1.4 (0.9)	NR	P=NS
	2	1032	1.4 (0.9)	104	670	1.4 (0.9)	NR	
Sanigorski, 2008 <sup>6</sup>	1	977	1.46 (1.17)	104-156	977	1.45 (1.24)	NR	NR
	2	835	1.57 (1.10)	104-156	835	1.48 (1.03)	NR	
Millar, 2011 <sup>7</sup>	1	778	60.6	156	778	54.2	0.75	P=0.01
	2	1276	55.7	156	1276	48.4		

b = Beta; BMI = Body Mass Index; F = F-stat; h/d = hours per day; h/week = hours per week; min. = minutes; N = Sample Size; NA = Not Available; NR = Not Reported; NS = Not Significant; P = P-value; PA = Physical Activity; SD = Standard Deviation; t = t-test value; T0 = Time 0; T1 = Time 1  
No selected intermediate outcomes for Sanigorski, 2008<sup>6</sup> and Jansen, 2011<sup>5</sup>

## References, Key Question 1: School-home-community Setting

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**Key Question 1. School-community based.**

**Evidence Table 18. Study characteristics for studies taking place in a school setting with community components**

Author, year Location	Years of recruitment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Macaulay, 1997 <sup>1</sup> Canada	1994-1995	Non-randomized intervention	NR	Yes	Children in grades 1-6 participated in the study.
Muckelbauer, 2009 <sup>2</sup> Germany	NR	Randomized intervention	Grade: 2nd and 3rd The study population comprised children attending the second and third grades of elementary schools in socially deprived neighborhoods of two cities in Germany, Dortmund and Essen. Participating schools must meet technical requirements for fountain installation.	Yes	
Muckelbauer, 2010 <sup>3</sup> Germany	NR	Randomized intervention	Grade: 2nd and 3rd Participating schools must meet technical requirements for the installation of a water fountain in the school building.	Yes	
Webber, 2008 <sup>4</sup> US	NR	Randomized intervention	Girls only Grade: Public middle schools (grades 6–8) eligible if certain conditions met* Language: English: School inclusion criteria:  Public middle schools (grades 6–8) eligible if the majority of children enrolled lived in the community served by the school  School not unwilling or unable to respond to and report medical emergencies that may occur on school grounds or during student participation in school sponsored activities  No plans of the school to close or merge with another school within 3 years  School with at least 90 girls in the 8th grade.  School with expected transience rate <28% in any given year or <35% over 2 years.  School offers physical education each semester for all grades.	No/Not reported	TAAG schools represented the demographic and socioeconomic makeup of their school districts, with preference given to schools with greater racial/ethnic and socioeconomic diversity.  Boxes 18, 19 and 21 filled using information from Stevens et al 2005  The primary sampling approach for the study was as follows: "Two cross-sectional samples, one drawn from 6th graders prior to the beginning of the intervention and the second drawn from 8th graders following the 2-year implementation of the intervention." [Stevens et al 2005].

Author, year Location	Years of recruitment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
			<p>School with at least 2 (year-round schools) or 3 (semester-based schools) physical education classes per week.</p> <p>School not participating in pilot testing of study materials.</p> <p>Student exclusion criteria:</p> <p>Able to read and understand questions written in English.</p> <p>No instruction (if any) by the doctor to avoid exercise for health reasons.</p> <p>Absence of medical conditions including:</p> <ul style="list-style-type: none"> <li>– muscle, bone, or joint problems</li> <li>– heart problem that requires a limitation in physical activity</li> <li>– fainting with exercise in the past 6 months</li> <li>– uncontrolled asthma</li> <li>– very high blood pressure not controlled on medication</li> <li>– diabetes with frequent very low or very high blood glucose levels</li> <li>– thyroid problems not controlled with medication</li> <li>– seizures not controlled with medication</li> <li>– sickle cell disease</li> <li>– cystic fibrosis</li> <li>– anorexia nervosa</li> <li>– severe kidney problems</li> <li>– severe liver problems</li> <li>– blood condition that increases the risk of bleeding</li> <li>• Parent unwilling or unable to give informed consent</li> <li>• Girl unwilling to assent to measurement</li> </ul>		
Utter,2011 <sup>5</sup>  New Zealand	2005-2006	Quasi-experiment	9-13 years old	Yes	

NR = Not Reported; TAAG = Trial of Activity for Adolescent Girls

**Evidence Table 19. Participant characteristics for studies taking place in a school setting with community components**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Macaulay, 1997 <sup>1</sup>	NR	156 weeks	NR	NR		Grade 1-6 Overall: (100)	Abstracted from Paradis, 2005 <sup>6</sup>
Muckelbauer, 2009 <sup>2</sup>	2950	47 weeks	Baseline characteristics did not differ between IG and CG regarding sex (P = 0.977)	Arm1: 8.34 (0.76) Arm2: 8.26 (0.73)		NR	
Muckelbauer, 2010 <sup>3</sup>	3190	47 weeks	Overall: (49.8)	Overall: 8.3 (0.7)		NR	
Webber, 2008 <sup>4</sup>	1721	156 weeks	Overall: 1721 (100)	NR	White, non-Hispanic Overall: 794 (46.1)  Black, non-Hispanic Overall: 405 (23.5)  Latino/Hispanic Overall: 212 (12.3)  Asian, American Indian, Multi-ethnic, or missing Overall: N: 310 (18.0)	Grade 6 Overall: 1721	Please note that the values presented above are for participant recruitment in Spring 2003  For Spring 2005: N = 3504 For Spring 2006: N = 3502  Six schools at each of the six field centers were randomized in equal numbers to either intervention or control condition after baseline measurements were collected.
Utter, 2011 <sup>5</sup>	3881	Mean:104	Overall:51.6 Arm1:54.3 Arm2:49.6	Age differs by group: Age was reported by age groups.	Asian/Pacific Islander Overall:12.6 (9.7) Arm1:14.6  Pacific Overall:(63.7) Arm1:(55.4) Arm2:(70.0)  Maori Overall:(16.0) Arm1:(23.3) Arm2:(11.0)  European Overall:(7.4) Arm1:(11.6)	NR	At baseline, there were 5837 students on the school rolls and 3881 students agreed to participate in the study (response rate 66%). After the 9- and 10-year-old students were removed from the data set for analyses, the final study sample at baseline included 1634 students.

					Arm2:(4.4)		
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N = Sample Size; NR = Not Reported; SD = Standard Deviation



**Evidence Table 20. Description of the interventions used in school settings with a community component**

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
Macaulay, 1997 <sup>1</sup>	2	Health education program  Length of intervention, weeks: 156 weeks  Setting: School: classroom curriculum Community or environment-level: community mobilization using media.	The lessons incorporate traditional learning styles and practical experiences and use interactive and cooperative learning techniques. They include storytelling, games, food tasting, experiments, puppet shows, crafts, and audiovisual presentations. The nutrition section discusses healthy eating, balanced meals, healthy snacks, avoidance of high-fat foods, nutrients and their roles, label reading, factors influencing eating habits, body image, and healthy weight. Traditional foods, as well as foods commonly eaten in the community, are incorporated throughout this section.  Target: Child  Delivery: Teacher  Duration: 45 minutes  Frequency: 10 sessions per year.		The fitness lessons section emphasizes the benefits and pleasure of daily physical activity and the different types of activity: aerobic, strength building, and flexibility.  Target: Child  Delivery: Teacher  Duration: 45 minutes  Frequency: 10 sessions per year.		Other : community mobilization		

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
Muckelbauer, 2009 <sup>2</sup>	2	<p>Combined environmental and educational intervention solely promoting water consumption</p> <p>Length of intervention, weeks: 39</p> <p>Setting: School: focused on classroom education Community or environment-level: water fountains were installed in intervention schools.</p>	<p>Four educational sessions of 45 minutes talked about water needs of the body and water circuits in nature. These were delivered in the classroom. Teachers received a booklet with the prepared curriculum including necessary material and performed the lessons at the beginning of the study.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 45 min Frequency: 4 sessions total Comment: The lessons are based on the theory of planned behavior. Teachers received a booklet with the prepared curriculum including necessary material and performed the lesson at the beginning of the study.</p>	<p>As an environmental modification, water fountains, which provided cooled and optionally carbonated water for free, were installed in the intervention schools, and each child received an appealing plastic water bottle. Each child received a plastic water bottle and teachers were to organize filling them out.</p> <p>Target: Child</p> <p>Delivery: Teacher Other: school</p> <p>Comment: As an environmental modification, water fountains, which provided cooled and optionally carbonated water for free, were installed in the intervention schools, and each child received an appealing plastic water bottle.</p>					
Muckelbauer, 2010 <sup>3</sup>	2	<p>Water consumption promoting intervention</p> <p>Length of intervention, weeks: 47</p> <p>Setting: School:</p>	<p>Focused on improving the beverage consumption of the children by increasing their water intake via a combination of environmental and educational measures.</p>	<p>The environmental intervention in schools consisted of the installation of one or two water fountains that provided free access to cooled plain or optionally carbonated water. Each child</p>			Goal setting		

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		focused on classroom instruction Community or environment-level: installation of water fountain in school.	<p>The educational intervention was led by the teachers, who conducted four 45-min lessons on water losses and needs of the body and on the water circuit in nature. The didactical elements of the lessons comprised age adjusted experiments, role plays, a song, and work sheets among others. No culture-specific adaptations of the lessons were provided.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 45 min Frequency: 4 sessions total</p> <p>Comment: The educational intervention was led by the teachers, who conducted lessons on water losses and needs of the body and on the water circuit in nature. The didactical elements of the lessons comprised age-adjusted experiments, role plays, a song, and work sheets among others. No culture-</p>	<p>received a plastic water bottle and teachers were to organize filling them out.</p> <p>Target: Child</p> <p>Delivery: Teacher Other: School</p> <p>Comment: The environmental intervention in schools consisted of the installation of one or two water fountains that provided free access to cooled plain or optionally carbonated water. In addition, each child received a plastic water bottle (500 mL), and teachers were encouraged to organize filling of the water bottles each morning for all children in the corresponding classes.</p>					

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			specific adaptations of the lessons were provided.						
Webber, 2008 <sup>4</sup>	2	<p>A 2 year study/staff-directed intervention targeted schools, community agencies, and girls to increase opportunities, support, and incentives for increased physical activity. A third-year intervention used school and community personnel to direct intervention activities</p> <p>Length of intervention, weeks: 104 weeks for the Staff-directed intervention and 156 weeks for the Champion-directed intervention</p> <p>Setting: School: A school-based community linked intervention Community or environment-level: A component linking schools to community agencies.</p>			<p>TAAG health education included six lessons in each of the 7th and 8th grades designed to enhance behavioral skills known to influence physical activity participation. Activity challenges associated with the lessons reinforced the contents, encouraged self-monitoring, and set goals for behavior change. To meet the varying formats in which health education was taught at the school, TAAG health education was offered in two forms: one for a traditional classroom setting and one for physical education class. TAAG physical education class promoted moderate vigorous physical activity (MVPA) for at least 50% of class time and encouraged teachers to promote physical activity outside of class. Physical education teachers were trained by TAAG</p>		Other : Community component	<p>Other: self monitoring</p> <p>Target: Child</p> <p>Duration: In addition, there was internet-based self-monitoring.</p>	

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
					<p>interventionists on class management strategies, skill-building activities, the importance of engaging girls in MVPA during class, and the provision of appropriate equipment and choices of physical activity. TAAG promotions used a social marketing approach<sup>41</sup> to promote awareness of and participation in activities through media and promotional events. TAAG promotions also provided school wide messages designed to increase the acceptance and support for physical activity for all girls.</p> <p>Target: Child</p> <p>Delivery: Teacher Staff-directed intervention fall ‘ 03-spring ‘05. Staff- and community-directed intervention fall ‘05-spring ‘06</p> <p>Duration: 6 lessons in each of the 7th and 8th</p>				

Author, year	Arm	Description	Psychosocial Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
Utter, 2011 <sup>o</sup>	2	<p>Living 4 Life intervention</p> <p>Length of Intervention (weeks): 156</p> <p>Setting: School: Focus was on intervention at school including breakfast clubs (with physical activity), lunch-time activities, after-school dance, health weeks and combined student–staff initiatives within the school environment (e.g. rebranding the school canteen).</p>	<p>Education to change attitude on breakfast clubs (with physical activity), and lunch-time activities</p> <p>Target: Child</p> <p>Delivery: student health councils</p>	<p>The installment of new water fountains and distribution of drink bottles; resources for external providers/ instructors (e.g. dance instructors); and improvements to the school canteen and eating area.</p> <p>Target: Child</p> <p>Delivery: School</p>	<p>grades.</p> <p>After-school dance, health weeks and combined student–staff initiatives within the school environment</p> <p>Target: Child</p> <p>Delivery: student health councils</p>	<p>Provision of sporting equipment</p> <p>Target: Child</p> <p>Delivery: school</p>			

mL = milliliter; MVPA = Moderate to vigorous physical activity; TAAG = Trial of Activity for Adolescent Girls

Evidence Table 21a. Weight related outcomes for studies with a diet intervention in a school setting with a community component.

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup time- point in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
BMI (Kg/m <sup>2</sup> )																
Muckelbauer, 2009 <sup>4</sup>	1	1309	17.39 (3.10)	36	1309	17.80 (3.26)	0.41									P= 0.037
	2	1641	17.11 (2.78)	36	1641	17.50 (2.97)	0.31									
Prevalence overweight																
Muckelbauer, 2009 <sup>4</sup>	1	1309	17.5	36	1309	19.8										
	2	1641	17.2	36	1641	17.4										
Prevalence Obese																
Muckelbauer, 2009 <sup>4</sup>	1	1309	8.4	36	1309	8.0										
	2	1641	6.2	36	1641	6.1										

BMI = Body Mass Index; kg/m<sup>2</sup> = kilogram per meter squared; N = Sample Size; P = p-value; SD = Standard Deviation

Table 21b. Weight related outcomes for diet intervention studies taking place in a school setting with community component, subgroup

Author, year	Arm	Subgroup	Base -line N	Baseline measure, mean (SD)	First followup time- point in weeks	N at first follow- up	First followup measure, mean (SD)	Mean change from base- line (SD)	Second followup time- point in weeks	N Second follow- up	Second followup measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of Association
% or Change in Prevalence																	
Muckelbauer, 2009 <sup>5</sup>	1	Non-immigrants	694	23.9	47	694	26.2										Grp2-G1 Odds Ratio: 0.51 CI: 0.31 to 0.83 P=0.007
	2		950	20.8	47	950	19.7										
	1	Immigrants	615	28.1	47	615	29.6										Grp2-G1 Odds Ratio:1.02 CI: 0.63 to 1.65 P=0.93
	2		691	26.9	47	691	28.7										

CI = Confidence Interval; Grp2-G1 = Group2 – Group 1; N = Sample Size; SD = Standard Deviation



Evidence Table 21c. Intermediate outcomes for studies with a diet intervention in a school setting with a community component.

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Self-reported mean consumption of soft drinks/juices (glasses/day)								
Muckelbauer, 2009 <sup>4</sup>	1	917	NA	36 weeks	917	NA	0.0 (p = 0.670)	No change in CG and significant decrease in IG
	2	1070	NA	36 weeks	1070	NA	-0.2 (p = 0.019)	

CG = Control Group; IG = InterventionN = Sample Size; NA = Not Available; P = p-value; SD = Standard Deviation

Table 22a. Weight related outcomes for physical activity intervention studies taking place in a school setting with community component

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
BMI (Kg/m2)																
Webber, 2008 <sup>6</sup>	1	NR	20.9	104		22.9		156		22.7						NS
	2	NR	20.7	104		22.7		156		22.8						
Kg																
Webber, 2008 <sup>6</sup>	1	NR	49.1	104		59.1		156		58.2						NS
	2	NR	48.6	104		58.4		156		58.4						
Percent body fat skin-fold thickness in mm																
Webber, 2008 <sup>6</sup>	1	NR	17.4	104		21.6		156		20.8						NS
	2	NR	17.2	104		21.2		156		21.2						
Percent body fat																
Webber, 2008 <sup>6</sup>	1	NR	28.1	104		31.8		156		31.3						NS
	2	NR	27.8	104		31.5		156		31.5						

BMI = Body Mass Index; Kg = Kilogram; Kg/m<sup>2</sup> = kilogram per meter squared; mm = millimeter; N = Sample Size; NR = Not Reported; NS = Not Significant; SD = Standard Deviation

Evidence Table 22b. Intermediate outcomes for physical activity intervention studies taking place in a school setting with a community component

Author, year	Arm	Baseline N	Baseline Measure, mean (SD)	Final Measure Timepoint	N at Final Measure	Final Followup Measure, mean (SD)	Mean Change from Baseline (SD)	Measure of Association	Notes
MET-weighted minutes of MVPA									
Webber, 2008 <sup>b</sup>	1	NA	147.2	104 weeks	NA	136.9	NA	Mean difference <u>at baseline</u> : -2.2 (95% CI: -13.2, 8.9)	N=1721 at baseline, 3504 at follow-up (not necessarily the same sample)
	2	NA	145.0	104 weeks	NA	136.5	NA	Mean <u>difference at follow-up</u> : -0.4 (95% CI: -8.2, 7.4)	
Minutes of MVPA									
Webber, 2008 <sup>b</sup>	1	NA	23.7	104 weeks	NA	22.4	NA	Mean difference <u>at baseline</u> : -0.0 (95% CI: -1.7, 1.7)	N=1721 at baseline, 3504 at follow-up (not necessarily the same sample)
	2	NA	23.7	104 weeks	NA	22.2	NA	Mean <u>difference at follow-up</u> : -0.2 (-1.4, 1.0)	
Minutes of Total PA									
Webber, 2008 <sup>b</sup>	1	NA	368.3	104 weeks	NA	325.6	NA	Mean difference <u>at baseline</u> : -2.0 (95% CI: -12.2, 8.3)	N=1721 at baseline, 3504 at follow-up (not necessarily the same sample)
	2	NA	366.4	104 weeks	NA	317.7	NA	Mean <u>difference at follow-up</u> : -7.9 (-14.9, -1.0)	
Minutes of Sedentary Behavior									
Webber, 2008 <sup>b</sup>	1	NA	458.0	104 weeks	NA	514.0	NA	Mean difference <u>at baseline</u> : -1.5 (-10.8, 7.9)	N=1721 at baseline, 3504 at follow-up (not necessarily the same sample)
	2	NA	456.5	104 weeks	NA	510.5	NA	Mean <u>difference at follow-up</u> : -3.5 (-11.1, 4.2)	

CG = Control Group; CI = Confidence Interval; IG = Intervention Group; MVPA = Moderate to Vigorous Physical Activity; N = Sample Size; NA = Not available; PA = Physical Activity; SD = Standard Deviation  
Intermediate outcomes only reported at baseline, not follow-up for Macaulay, 1997<sup>2</sup> Muckelbauer, 2010<sup>5</sup> is a subgroup analysis of Muckelbauer, 2009<sup>4</sup> by immigration status

Evidence Table 23a. Weight-related outcomes for combined diet and physical activity interventions in a school setting with a community component.

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
BMI z-score																
Madsen, 2009 <sup>3</sup>		91			91	-0.04										
Utter, 2011 <sup>7</sup>	1	NR	1.02; 95% CI: 0.9 to 1.2									156 weeks		0.95; 95% CI: 0.8 to 1.5		P = 0.13
	2	NR										156 weeks		1.11; 95% CI: 1.0 to 1.3		P = 0.13
BMI-kg/m <sup>2</sup>																
Crespo, 2012 <sup>1</sup>	1	227	1.00(1.10)	52	223	0.99(1.12)		104	172	1.03 (1.08)		156 weeks	137	0.97(1.09)		
	2	194	median (SD) = 0.94, (1.23)		168	0.95(1.13)		104	140	1.01 (1.08)			97	1.00(1.04)		
	3	216	0.87(1.11)		204	0.85(1.09)		104	156	0.93(1.10)			128	0.99(1.05)		
	4	163	0.86(1.12)		148	0.86(1.06)		104	119	0.94(0.99)			83	0.95(1.05)		
Macaulay, 1997 <sup>2</sup>	1	140	17.76; (SE 0.41)	104	119	19.81; (SE 0.54)		208	NR	NR		416 weeks	NR	NR		F(1265)<1
	2	394	17.24; (SE 0.21)	104	330	19.04; (SE 0.28)		208	309	19.06; (SE 0.23)		416 weeks	338	19.46; (SE 0.23)		F(1265)<1
Utter, 2011 <sup>7</sup>	1	NR	25.14; 95% CI: 24.3 to 26.0									156 weeks		25.02; 95% CI: 24.2 to 25.9		P = 0.18
	2	NR	25.36; 95% CI:									156 weeks		25.82; 95% CI:		P = 0.18

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
			24.7 to 26.0											25.2 to 26.5		
<b>BMI-percentile</b>																
Crespo, 2012 <sup>1</sup>	1	227	74.84 (25.50)	52	209	74.07 (27.04)		104	172	75.41 (25.81);		156 weeks	137	73.51 (27.24)		
	2	198	median (SD) =72.64, (27.30)	52	168	73.83 (26.43)		104	140	74.66 (25.76);		156 weeks	97	75.08 (25.48)		
	3	218	72.15 (26.87)	52	204	74.23 (25.60)		104	156	74.23 (25.60)		156 weeks	128	75.49 (26.67)		
	4	165	72.15 (27.28)	52	148	72.63 (26.26)		104	119	75.43 (23.81)		156 weeks	83	74.62 (25.86)		
<b>% Obese (above 95th percentile)</b>																
Crespo, 2012 <sup>1</sup>	1	223	31%	52	209	33%		104	172	35%		156 weeks	137	35%		
	2	194	median (SD) =31%	52	168	29%		104	140	29%		156 weeks	97	30%		
	3	216	28%	52	204	26%		104	156	27%		156 weeks	128	35%		
	4	163	27%	52	148	27%		104	119	26%		156 weeks	83	32%		
<b>Percent Overweight</b>																
Crespo, 2012 <sup>1</sup>	1	223	18%	52	209	17%;		104	172	17%;		156 weeks	137	13%;		
	2	194	median (SD) =14%;	52	168	17%;		104	140	22%;		156 weeks	97	23%;		
	3	216	19%	52	204	19%		104	156	21%		156 weeks	128	20%		
	4	163	19%	52	148	17%		104	119	21%			83	18%		
<b>Wieght (kg)</b>																
Utter, 2011 <sup>7</sup>	1	NR	72.74; 95% CI:	104		71.91; 95% CI:						156 weeks				P = 0.21

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
			71.1 to 74.4			69.6 to 74.2										
	2	NR	NR	104		74.21; 95% CI: 72.5 to 76.0						156 weeks				P = 0.21
Body fat percentage																
Utter, 2011 <sup>7</sup>	1	NR	31.30; 95% CI: 29.9 to 32.7									156 weeks		30.18; 95% CI: 28.2 to 32.2		P = 0.16
	2	NR	NR									156 weeks		31.82; 95% CI: 30.4 to 33.2		P = 0.16
Mean of 3 subscapular skin fold thickness in mm																
Macaulay, 1997 <sup>2</sup>	1	140	9.05; (SE 0.67)	104	119	14.88; (SE 0.94)		208	NR	NR			NR	NR		F(1266) = 20.94; P<.01
	2	394	7.62; (SE 0.35)	104	330	10.36; (SE 0.49)		208	309	11.73; (SE 0.41)		416	338	12.50; (SE 0.43)		F(1266) = 20.94; P<.01
Mean of 3 tricep skinfold thickness in mm																
Macaulay,	1	140	10.84;	104	119	17.43;		208	NR	NR		NR	NR	NR		F(1266) =

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
1997 <sup>2</sup>			(SE 0.63)			(SE 0.88)										17.94; P<.01
	2	394	11.29; (SE 0.33)	104	330	15.24; (SE 0.45)		208	309	17.00; (SE 0.38)		416	338	15.19; (SE 0.40)		

BMI = Body Mass Index; CI = Confidence Interval; F = F test value; Kg/m<sup>2</sup> = kilogram per meter squared; N = Sample Size; NR = Not Reported; P = p-value; SD = Standard Deviation; SE = Sample Error



Evidence Table 23b. Weight-related outcomes for combined diet and physical activity interventions in a school setting with a community component, subgroup

Author, year	Arm	Subgroup	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First followup measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
BMI change																	
Madsen, 2009 <sup>3</sup>		Normal Weight	46			46 (out of 91)		-0.03									T2Var1: -0.03 p-value: 0.473
Madsen, 2009 <sup>3</sup>		Overweight children	16			16 (out of 91)		-0.06									T2Var1:-0.06 p-value: 0.398 overweight children increased the total number of laps they could run from a mean of 24 at baseline to 36 at follow-up (p < 0.004).
Madsen, 2009 <sup>3</sup>		Obese participants	29			29 (out of 91)		-0.05									T2Var1:-0.05 p-value: 0.079 obese children increased the total number of laps they could run from a mean of 18 at baseline to 25 at follow-up (p < 0.001).

Author, year	Arm	Subgroup	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First followup measure, mean (SD)	Mean change from baseline (SD)	Second follow-up time-point in weeks	N Second follow-up	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Madsen, 2009 <sup>3</sup>		Girls	47			47 (out of 91)		-0.03									T2Var1:-0.03 p-value: 0.386 Normal weight children increased the total number of laps they could run from a mean of 22 at baseline to 42 at follow-up (p < 0.001).
Madsen, 2009 <sup>3</sup>		Boys	44			44 (out of 91)		-0.05									T2Var1:-0.05 p-value: 0.156

BMI = Body Mass Index; N = Sample Size; P = p-value; SD = Standard Deviation; T2Var1 = Time 2 Variable 1

Evidence Table 23c. Clinical outcomes for combined diet and physical activity intervention studies taking place in a school setting with community components

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Fitness level amongst overweight, 20m shuttle run								
Madsen, 2009 <sup>3</sup>			22 laps	End of spring		42 laps	10 laps	

m = meter; N = Sample Size; SD = Standard Deviation

Evidence Table 23d. Intermediate outcomes for combination diet and physical activity intervention studies taking place in a school setting with community components

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Fruits and Vegetables</b>								
Crespo, 2012 <sup>1</sup>	1	223	1.80 (2.72)	104 weeks	137	2.27 (2.64)	0.47	
	2	163	1.89 (2.66)	104 weeks	83	2.31 (2.86)	0.42	
	3	2126	1.69 (2.45)	104 weeks	128	1.84 (2.03)	0.15	
	4	194	1.90 (3.19)	104 weeks	97	2.22 (2.85)	0.32	
<b>SSB</b>								
Crespo, 2012 <sup>1</sup>	1	223	0.88 (1.65)	104 weeks	137	0.39 (0.97)	-0.49	
	2	163	0.88 (1.59)	104 weeks	83	0.56 (1.26)	-0.32	
	3	2126	0.83 (1.71)	104 weeks	128	1.25 (0.39)	0.42	
	4	194	0.78 (1.37)	104 weeks	97	2.69 (1.95)	1.91	
Utter, 2011 <sup>7</sup>	1	953	16.6; 95% CI 13.8, 19.4)	156 weeks	589	17.5; 95% CI (14.4, 20.6)	0.90	P = 0.42
	2	681	20.4; 95% CI (17.9, 23.0)	156 weeks	1023	14.2; 95% CI (12.0, 16.3)	6.20	P = 0.42
<b>Snacks</b>								
Crespo, 2012 <sup>1</sup>	1	223	1.51 (3.48)	104 weeks	137	1.04 (2.54)	-0.47	
	2	163	1.74 (3.81)	104 weeks	83	1.64 (4.87)	0.90	
	3	2126	1.39 (3.47)	104 weeks	128	1.02 (2.59)	-0.37	
	4	194	1.39 (2.85)	104 weeks	97	0.95 (3.16)	-0.44	
<b>Sugar consumption index</b>								
Macaulay, 1997 <sup>2</sup>	1	140	2.18 (SE 0.25)	104	119	1.72 (SE 0.22)		F(1150)<1
	2	394	2.34 (SE 0.15)	416	338	1.99 (SE 0.12)		
<b>Fat consumption index</b>								
Macaulay, 1997 <sup>2</sup>	1	140	1.16 (SE 0.13)	104	119	1.17 (SE 0.15)		F(1154)<1
	2	394	1.30 (SE 0.08)	416	338	1.18 (SE 0.09)		
<b>Fruit and vegetable consumption index</b>								
Macaulay, 1997 <sup>2</sup>	1	140	3.28 (SE 0.27)	104	119	3.57 (SE 0.27)		F(1130) = 1.12
	2	394	3.05 (SE 0.16)	416	338	2.91 (SE 0.15)		
<b>Healthiness of school canteen (% reporting mostly healthy)</b>								
Utter, 2011 <sup>7</sup>	1	953	35.8; 95% CI (32.2, 39.4)	156 weeks	589	38.2; 95% CI (34.3, 42.1)	2.40	P =0.07
	2	681	26.6; 95% CI (23.7, 29.4)	156 weeks	1023	25.5; 95% CI (22.8, 28.2)	-1.10	P =0.07
<b>Physical Activity</b>								
Crespo, 2012 <sup>1</sup>	1	223	3.00 (0.90)	104 weeks	137	3.28 (0.89)	0.28	
	2	163	2.98 (0.81)	104 weeks	83	3.15 (0.80)	0.17	
	3	2126	2.97 (0.91)	104 weeks	128	3.06 (0.91)	0.09	
	4	194	3.11 (0.85)	104 weeks	97	3.41 (0.84)	0.30	

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Sports, total sports participated in last year</b>								
Crespo, 2012 <sup>1</sup>	1	223	1.05 (1.10)	104 weeks	137	2.05 (1.36)	1.00	
	2	163	0.65 (0.85)	104 weeks	83	1.92 (1.01)	1.27	
	3	2126	0.92 (0.97)	104 weeks	128	1.49 (1.04)	0.57	
	4	194	0.70 (0.98)	104 weeks	97	1.81 (1.50)	1.11	
<b>Physical Activity frequency (# of 15min episodes in last 7 days)</b>								
Macaulay, 1997 <sup>2</sup>	1	140	17.64 (SE1.95)	104	119	22.14 (SE 2.68)		F(1212)<1
	2	394	20.58 (SE 1.08)	416	338	22.27 (SE 0.96)		
<b>Lunch-time activity (% yes)</b>								
Utter, 2011 <sup>7</sup>	1	953	34.2; 95% CI (30.6, 37.7)	156 weeks	589	31.2; 95% CI (27.5, 35.0)	-3.00	P =0.57
	2	681	39.8; 95% CI (26.9, 32.7)	156 weeks	1023	31.7; 95% CI (28.8, 34.5)	-8.10	P =0.57
<b>After-school activity (% doing any in past 5 days)</b>								
Utter, 2011 <sup>7</sup>	1	953	83.1; 95% CI (80.2, 85.9)	156 weeks	589	81.5; 95% CI (78.4, 84.6)	-1.60	P = 0.65
	2	681	83.5; 95% CI (81.1, 85.8)	156 weeks	1023	81.9; 95% CI (79.6, 84.3)	-1.60	P = 0.65
<b>TV Viewing</b>								
Crespo, 2012 <sup>1</sup>	1	223	2.10 (1.21)	104 weeks	137	2.09 (1.22)	-0.01	
	2	163	2.05 (1.22)	104 weeks	83	1.76 (0.94)	-0.29	
	3	2126	2.10 (1.23)	104 weeks	128	2.04 (1.22)	-0.06	
	4	194	2.21 (1.29)	104 weeks	97	1.69 (0.97)	-0.52	
<b>TV use (% using on all of past 5 days)</b>								
Utter, 2011 <sup>7</sup>	1	953	40.4; 95% CI (36.7, 44.0)	156 weeks	589	38.5; 95% CI (34.6, 42.5)	-1.90	P =0.09
	2	681	41.9; 95% CI (38.8, 45.0)	156 weeks	1023	33.9; 95% CI (31.0, 36.8)	-8.00	P =0.09
<b>Television watching on Saturdays</b>								
Macaulay, 1997 <sup>2</sup>	1	140	2.97 (SE 0.09)	104	119	2.88 (SE 0.10)		F(1189) = 1.34
	2	394	2.93 (SE 0.05)	416	338	2.99 (SE 0.05)		
<b>Television watching on school days</b>								
Macaulay, 1997 <sup>2</sup>	1	140	2.78 (SE 0.13)	104	119	2.58 (SE 0.14)		F(1189) = 2.67
	2	394	2.48 (SE 0.08)	416	338	2.66 (SE 0.08)		

BMI = Body Mass Index; N = Sample Size; P = p-value; SD = Standard Deviation; SSB = Sugar Sweetened Beverages; SE = Sample Error; CI = Confidence Interval; F = F test value

## References, Key Question 1: School-community Setting

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**Key Question 1. School-CHI and School-home-CHI based.**

**Evidence Table 24. Study characteristics for studies taking place in a school setting with consumer health informatics components and in a school setting with home and consumer health informatics components**

Author, year	Years of recruitment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Location					
<b>School/CHI</b>					
Schneider, 2007 <sup>1</sup>  Not reported	NR	Non-randomized intervention	Grade: 10 <sup>th</sup> and 11 <sup>th</sup> 1) fewer than three 20-min bouts per week of vigorous physical activity and fewer than five 30-min bouts per week of moderate physical activity; 2) VO2peak at or below age-specific 75 <sup>th</sup> percentile; 3) ability to exercise without restrictions; 4) eumennorheic; and 6) not taking any medications known to influence bone health (e.g., steroids).	No/Not reported	Participants were all adolescent females. The intervention was allocated at the school level. Two public high schools within a single school district participated in the study. The study was conducted over 3 consecutive school years. Assessments were conducted at a university-based general clinical research center at baseline (summer), semester 1 (the end of fall semester) and semester 2 (the end of spring semester).
Spiegel, 2006 <sup>2</sup>  US	NR	Randomized intervention	Grade: 4-5	No/Not reported	
Gorely, 2011 <sup>3</sup>  England	NR	Non-randomized Intervention	Grade: Primary school	Yes	
<b>School/Home/ CHI</b>					
Gorely, 2011 <sup>3</sup>  England	NR	Non-randomized Intervention	Grade: Primary school	Yes	

CHI = Consumer Health Informatics; NR = Not Reported; US = United States; VO2 = Maximal oxygen consumption

**Evidence Table 25. Participant characteristics for studies taking place in a school setting with consumer health informatics components and in a school setting with home and consumer health informatics components**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	RACE, N (%)	Grade level, N (%)	Comments
<b>School/CHI</b>							
Schneider, 2007 <sup>1</sup>	122	30 weeks	(100)	Overall: 15.04 (.79)	<p>White, non-Hispanic Overall: 70 (57) Arm 1: (49) Arm 2: (68)</p> <p>Latino/Hispanic Overall: 24 (20)</p> <p>Asian/Pacific Islander Overall: 21 (17)</p> <p>Overall: 7 (6) The intervention group included a greater proportion of non-Hispanic whites (68% vs. 49%) = 4.03, P &lt; 0.05).</p>	NR	<p>At baseline, intervention and comparison groups were comparable in height (mean = 1.62 m, standard deviation = 0.57), weight (mean = 60.80 kg, standard deviation = 11.90), BMI (mean = 23.22, standard deviation = 4.54), GPA (mean = 3.24, standard deviation = 0.76), self-reported health (single item, range 1 to 5; mean = 2.98, standard deviation = 0.81), average daily caloric consumption (mean = 1495.34 kcal, standard deviation = 438.67), and daily calcium intake (mean = 797 mg, standard deviation = 387).</p> <p>The intervention group was heavier and had higher body fat at baseline than the comparison group.</p> <p>Subjects who completed the study reported better overall health [t(145) = 2.11, P &lt; 0.05] and a higher GPA [t(136) = 4.21, P &lt; 0.001] at baseline than subjects who did not.</p>
Spiegel, 2006 <sup>2</sup>	1013	34 weeks	NR	NR		Grade 4-5 Overall: 1013	
Prins, 2012 <sup>4</sup>	1213	26 weeks	Arm1:46.6 Arm2:47.2 Arm3:49.1	Arm1:12.6(0.4) Arm2:12.7(0.5) Arm3:12.7(0.5)	<p>Western (both parents from Europe, North America, Oceania, Japan, Indonesia Overall:(82.3) Arm1:(74.8) Arm2:(77.9)</p> <p>Non-Western (at least one parent not born in Europe, North America, Oceania, Indonesia, Japan) Overall:(17.7) Arm1:(25.2) Arm2:(22.1)</p>	NR	
Ezendam, 2012 <sup>5</sup>	883	114 weeks	Arm1:50.3 Arm2:41.1	Arm1:12.6(0.6) Arm2:12.7(0.7)	Western (both parents born in Europe, North America, Oceania,	NR	

					Indonesia, Japan) Arm1:314(78.9) Arm2:320(66.0) Non-Western (at least one parent not born in Europe, North America, Oceania, Indonesia, Japan) Arm1:84(21.1) Arm2:165(34.0)		
<b>School/Home/ CHI</b>							
Gorely, 2011 <sup>3</sup>	589	120 weeks	NR	Arm1: 8.86 Arm2: 8.76	White, Non-Hispanic Arm1:(96.5) Arm2:(94.8)	NR	Participant characteristics taken from Gorely et al.

CHI = Consumer Health Informatics; GPA = Grade Point Average; kcal = kilocalories; N = Sample Size; NR = Not Reported; SD = Standard Deviation



**Evidence Table 26. Description of the interventions used in school settings with consumer health informatics components and in a school setting with home and consumer health informatics components**

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
<b>School/CHI</b>									
Schneider, 2007 <sup>1</sup>	2	Physical activity intervention  Length of intervention: 30 weeks  Setting: School The intervention goal was to increase students' levels of physical activity through supervised in-class activity, health education, and Internet-based self-monitoring.			One day per week was devoted to an educational discussion related to the health benefits of exercise and strategies for adopting an active lifestyle.  Target: Child  Duration: 60mins Frequency: 1 day per week.	Supervised activities were selected based on student input, and included a variety of aerobic (3 times per week, including aerobic dance, kickboxing, and brisk walking) and strength-building (1 time per week, including weightlifting and yoga) activities.  Target: Child  Duration: 60minutes Frequency: 4 sessions	Other:self-monitoring		
Spiegel, 2006 <sup>2</sup>	2	Wellness, Academics & You (WAY): A multidisciplinary program  Length of intervention, weeks: 1 "school year"  Setting: School Mainly classroom Consumer health informatics	The WAY program, a 5-moduleprogram, is intended to engage students in multidisciplinary activities in language arts, mathematics, science, and health content, building their academic skills while developing their health attitudes, behavioral intent, and, ultimately,		The WAY program, a 5-moduleprogram, is intended to engage students in multidisciplinary activities in language arts, mathematics, science, and health content, building their academic skills while developing their health attitudes, behavioral intent, and, ultimately, behavior.	An aerobic exercise routine. A video provided a common baseline exercise routine for all intervention classes.  The routine is intended to build up intensity to moderate to vigorous physical activity (MVPA) and to provide a cooled down period.  Target: Child	Other: Modules focusing on (1) self-management, home-based interventions, as well as learning about how genetics, family history, the human body, and how the body is related to behavior. Students also kept a personal daily journal to help in self-		Arm B, a third group, the new control group, consisted of 104 children who had not had the opportunity to participate in the original

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
School/CHI									
		Communication through a website.	<p>behavior.</p> <p>The nutritional program (Module 4) addresses nutrition and the way you eat (diet). This section provides consistent messages and information with the 5 A Day media campaign. Students learn about nutrients, eating balanced meals, balancing energy input with energy output, the food pyramid, nutrient density, and serving sizes. They compare their beliefs about nutrition with their food choices and behaviors.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: Ranging from 20 minutes to 1 hour or more depending on the type of activity.</p>		<p>The physical activity component (Module 3) focuses on physical activity and fitness. Students learn about the F.I.T.T. (Frequency, Intensity, Time, and Technique) principles, how to design a basic workout routine, and how to incorporate physical activity into their daily routine. Students apply this knowledge in social contexts, examining their attitudes and beliefs and projecting these on intended behavior through role-play, journaling, and other techniques.</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: Ranging from 20 minutes to 1 hour or more depending on the type of activity.</p>	<p>Delivery: Teacher</p> <p>Physical education teacher</p> <p>Duration: A 10-minute session following the intervention classes</p> <p>Frequency: Daily after the intervention class.</p>	management		<p>study. Of these 104 children, 53 had attended a local elementary school that was not used in the curriculum project but was considered a back up school if needed.</p>
Prins, 2012 <sup>4</sup>	2	YouRAction  Length of			Composed of three online lessons to promote physical activity: Lesson 1				

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
<b>School/CHI</b>									
		Intervention (weeks): 3 weeks  Setting: School: school based online lessons Health Informatics: web-based computer tailored PA promotion intervention			focus on improving MVPA and awareness of ones PA. Lesson 2 & 3 focus on having participant make a change in their PA and set a PA goal.  Target: Child  Delivery: Teacher  Frequency: one session per week Comments:				
Prins, 2012 <sup>4</sup>	3	YouRAction + e (environment)  Length of Intervention (weeks): 3 weeks  Setting: School: school based online lessons + feedback on nearby PA facilities Health Informatics: web-based computer tailored PA promotion intervention			Composed of three online lessons to promote physical activity: Lesson 1 focus on improving MVPA and awareness of ones PA. Lesson 2 & 3 focuses on having participant make a change in their PA and set a PA goal. Same as YouRAction, but with addition of feedback on availability of PA facilities near them (playgrounds, sport clubs, etc.)  Target: Child, Teacher  Frequency: one session per week				
Ezendam, 2012 <sup>5</sup>	2	FATaintPHAT intervention  Length of	Web-based computer modules were taken by each participant. Modules consisted of		Web-based computer modules were taken by each participant. Modules consisted of information to		Target: Child  Delivery: Teacher	Intervention: Pedometer	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
<b>School/CHI</b>									
		Intervention (weeks): 10 weeks  Setting: School: Web-based computer lessons conducted by teacher Health Informatics: computer-tailored intervention	information to promote increased PA, healthier diet, and reduce TV screen time. Target: Child Delivery: Teacher,  Duration: 15 minutes per session  Frequency: 8 sessions per 10 weeks Comments:		promote increased PA, healthier diet, and reduce TV screen time.  Target: Child  Delivery: Teacher,  Duration: 15 minutes per session  Frequency: 8 sessions per 10 weeks		Comments: 15 minutes per session for 8 sessions in 10 weeks. Web-based computer modules were taken by each participant. Modules consisted of information to promote increased PA, healthier diet, and reduce TV screen time.		
<b>School/Home/CHI</b>									
Gorely, 2011 <sup>3</sup>	2	GreatFun2Run intervention Length of Intervention (weeks): 40 weeks Setting: School: classroom and PE sessions Home: Interactive website for parents and children Community: Health Informatics: Local media campaign to promote healthy nutrition and PA Aim at policy change:	Classroom activity to promote healthier diet and nutrition, including CD-rom, online website , summer activity planner, local media campaign (lessons also involved PA promotion)  Target: Child  Delivery: Teacher,  Comments: no mention of frequency or duration	NR	Classroom activity to promote PA including CD-rom, online website , summer activity planner, local media campaign (lessons also involved healthy diet information)  Target: Child  Delivery: Teacher,  Comments: no mention of frequency or duration	PE lessons aimed to increase running skills, two highlight events (1 mile run/walk)  Target: Child  Delivery: Teacher,  Frequency: 2hrs of PA per week	NR	NR	

CHI = Consumer Health Informatics; FITT = Frequency, Intensity, Time Technique; MVPA = Moderate to Vigorous Physical Activity; PE = Physical Education; PA = Physical Activity

**Evidence Table 27. Weight related outcomes for physical activity intervention studies taking place in a school setting with consumer health informatics components**

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time- point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base- line (SD)	Measure of association
<b>BMI percentile</b>																
Schneider 2007 <sup>1</sup>	1	59	63.14 (25.02)	15	59	62.13 (26.18)		30	59	59.42 (26.67)						Group X time p value 0.04
	2	63	69.07 (28.82)	15	63	68.38 (28.97)		30	63	69.31 (28.40)						There was a small increase over time in BMI in the intervention group relative to the comparison group
<b>Percent Overweight</b>																
Prins, 2012 <sup>4</sup>	1	381	14.4%	26	293	13.6%										
Prins, 2012 <sup>4</sup>	2	321	Median (SD) =16.1%	26	254	16.1%										% overweight = 0.28 (95% CI - 0.86-1.42) group 2 to group 3
Prins, 2012 <sup>4</sup>	3	361	20.6%	26	281	20.6%										% overweight = 0.28 (95% CI - 0.86-1.42) group 2 to group 3
<b>Waist circumference, cm</b>																
Prins, 2012 <sup>4</sup>	1	381	66.2 (7.9)	26	293	67.5 (7.8)										
Prins, 2012 <sup>4</sup>	2	321	Median		254	68.3										difference in

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first followup	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second follow- up time- point in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time- point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base- line (SD)	Measure of association
			(SD) =67.1, (7.9)			(8.2)										change in WC = -0.38 (95% CI - 1.39 - 0.62); p=NR
Prins, 2012 <sup>4</sup>	3	361	68.6 (8.7)		281	70.4 (9.4)										difference in change in WC = -0.16 (95% CI - 0.82 - 1.15); p=NR
Percent body fat DXA																
Schneider 2007 <sup>1</sup>	1	59	31.17 (5.35)	15	59	30.72 (5.7)		30	59	30.76 (6.02)						Group X time p value 0.45
	2	63	33.06 (6.3)	15	63	32.51 (6.4)		30	63	33.19 (6.55)						There was no differential change in percent body fat over time in the intervention group relative to the comparison group
Kilograms																
Schneider 2007 <sup>1</sup>	1	59	58.88 (9.8)	15	59	59.17 (9.91)		30	59	59.03 (10.03)						There was a small increase over time in weight in the intervention group relative to the comparison group
	2	63	62.60(13.4)	15	63	63.29 (14.06)		30	63	59.03 (10.03)						Group X time p value 0.04

CI = Confidence Interval; N = Sample Size; SD = Standard Deviation; SE = Sample Error

**Evidence Table 28a. Weight related outcomes for combination diet and physical activity intervention studies taking place in a school setting with consumer health informatics components and in a school setting with home and consumer health informatics components**

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second follow- up time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base- line (SD)	Measure of association
<b>BMI, kg/m<sup>2</sup></b>																
Ezendam, 2012 <sup>5</sup>	1	376	19.23 (2.96)									114	337	20.67 (3.15)		difference in BMI post-intervention+ 0.14 (95% CI - 0.17-0.45); p-value = NR
Ezendam, 2012 <sup>5</sup>	2	440	Median (SD) = 19.48, (3.45)										391	21.08 (3.93)		
Gorely, 2011 <sup>3</sup>	1	279	17.3 (2.5)									120	215	18.8 (2.9)		Beta = 0.1 (95% CI 0.05-0.2); p- value = <0.05
Gorely, 2011 <sup>3</sup>	2	310	Median (SD) =17.9, (2.9)										206	19.3 (3.6)		
<b>BMI, SDS</b>																
Gorely, 2011 <sup>3</sup>	1	279	0.4 (1.1)									120	215	0.4 (1.1)		Beta = 0.04 (95% CI 0.02-0.1); p- value < 0.05
Gorely, 2011 <sup>3</sup>	2	310	Median (SD) =0.6, (1.1)										206	0.6 (1.2)		
<b>Change in BMI</b>																
Spiegel, 2006 <sup>2</sup>	1	479		24	479		0.5210 (1.01610) SE=0.04 643									
	2	534		24	534		0.1606									The Pearson

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second follow- up time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base- line (SD)	Measure of association
							(0.89446) SE=0.03 871									Correlation for change in BMI baseline to post- data measure with treatment (r = - 0.186; N 1013) was significant at the 0.01 level (two-tailed).
Percent Overweight/ Obese																
Ezendam, 2012 <sup>5</sup>	1	376	13.0									114	340	16.2		OR = 0.91 (95% CI 0.52-1.61)
Ezendam, 2012 <sup>5</sup>	2	440	Median (SD) =15.7										393	17.8		
Percent Underweight																
Ezendam, 2012 <sup>5</sup>	1	398	9.0%									104				
Ezendam, 2012 <sup>5</sup>	2	485	Median (SD) = 9.1%													
Ezendam, 2012 <sup>5</sup>	1	376	66.82(6.95 )									114	339	73.24 (8.20)		difference in WC post- intervention=0.6 (95% CI -0.44- 1.64); p=NR
Ezendam, 2012 <sup>5</sup>	2	442	Median (SD) = 67.88, (8.13)										393	74.70 (9.78)		
Waist Circumference, cm																



Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second follow- up time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base- line (SD)	Measure of association
Gorely, 2011 <sup>3</sup>	1	279	59.6 (7.2)									120	215	64.8 (7.4)		Beta=0.4 (95% CI 0.1-0.6); p<0.05
Gorely, 2011 <sup>3</sup>	2	310	Median (SD) =60.3, (7.9)									120	206	65.4 (8.8)		
Percent Body Fat																
Gorely, 2011 <sup>3</sup>	1	279	21.7 (7.4)									120	206	23.6 (7.8);		Beta=0.2 (95% CI -0.03-0.4); p=NS
Gorely, 2011 <sup>3</sup>	2	310	Median (SD) =22.6, (7.2)										215	24.7 (8.8)		
Body fat, summ of 4 SF measures																
Gorely, 2011 <sup>3</sup>	1	279	21.5 (9.9)									120	215	24.4 (11.8)		Beta=0.3 (95% 0- 0.7); p=NS
Gorely, 2011 <sup>3</sup>	2	310	Median (SD) =23.0(10. 3)									120	206	26.1 (13.3)		

CI = Confidence Interval; N = Sample Size; NR = Not Reported; NS = Not Significant; SD = Standard Deviation; SE = Sample Error; WC = Waist Circumference

**Evidence Table 28b. Weight related outcomes for combination diet and physical activity intervention studies taking place in a school setting with consumer health informatics components and in a school setting with home and consumer health informatics components, subgroups**

Author, year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
<b>BMI-kg/m^2</b>																	
Gorely, 2011 <sup>3</sup>	1	Girls	142	17.5 (2.6)									120	NR	18.8 (2.9)		NR
Gorely, 2011 <sup>3</sup>	2	Girls	160	Median (SD) =18.1, (3.1)										NR	19.6 (3.8)		
Gorely, 2011 <sup>3</sup>	1	Boys	137	17.2 (2.4)									120	NR	18.8 (2.9)		NR
Gorely, 2011 <sup>3</sup>	2	Boys	150	Median (SD) =17.7, (2.7)										NR	18.9 (3.3)		
<b>BMI, SDS</b>																	
Gorely, 2011 <sup>3</sup>	1	Boys	137	0.4 (1.1)									120	NR	0.5 (1.2)		NR
Gorely, 2011 <sup>3</sup>	2	Boys	150	Median (SD) =0.6, (1.1);										NR	0.6(1.2);		
Gorely, 2011 <sup>3</sup>	1	Girls	142	0.4 (1.0)									120	NR	0.3(1.0);		NR
Gorely, 2011 <sup>3</sup>	2	Girls	160	Median (SD) =0.6, (1.1);										NR	0.5(1.2);		
<b>Percentage overweight or at risk of overweight</b>																	
Spiegel, 2006 <sup>2</sup>	1	% <85%ile	479	60.5	24	479	60.6										
	2		534	63.7	24	534	65.7										
	1	% >85% and <95%	479	17.7	24	479	18.2										
	2		534	17.1	24	534	15.6										
	1	% >95%	479	21.7	24	479	21.3										

Author, year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
	2		534	19.3	24	534	18.8										
<b>Percent Overweight/Obese</b>																	
Ezendam, 2012 <sup>b</sup>	1	At Risk Goup	342	14.3									114	289	18.0;		OR = 0.91 (95% CI 0.51-1.62)
Ezendam, 2012 <sup>b</sup>	2	At Risk Goup	400	Median (SD) =17.3										325	18.8;		
<b>BMI-kg/m^2</b>																	
Ezendam, 2012 <sup>b</sup>	1	At Risk Goup	342	19.62(2.81)									114	286	21.11 (3.06)		difference in BMI post-intervention= 0.11 (95% CI -0.27 - 0.49); p-value NR
Ezendam, 2012 <sup>b</sup>	2	At Risk Goup	400	Median (SD) =19.91, (3.33);										323	21.36 (3.78)		
<b>Waist circumference, cm</b>																	
Ezendam, 2012 <sup>b</sup>	1	At risk group	342	67.55(6.82)									114	288	73.96(8.13);		difference in WC post-intervention= 0.55 (95% CI -0.55-1.64); p=NR
Ezendam, 2012 <sup>b</sup>	2		400	Median (SD) =68.78, (7.96)										325	75.26 (9.82)		
Gorely, 2011 <sup>3</sup>	1	Boys	137	60.8 (7.5)									120	NR	66.0 (7.4)		NR
Gorely, 2011 <sup>3</sup>	2	Boys	150	Median (SD) =60.5, (6.9)											65.7 (7.7)		
Gorely, 2011 <sup>3</sup>	1	Girls	142	58.5 (6.7)									120	NR	63.7 (7.3)		NR
Gorely, 2011 <sup>3</sup>	2	Girls	160	Median (SD) =60.1, (8.9)											65.0 (9.8)		

Author, year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
Percent Body Fat																	
Gorely, 2011 <sup>3</sup>	1	Boys	137	17.6 (6.6)									120	NR	20.2 (8.3)		NR
Gorely, 2011 <sup>3</sup>	2	Boys	150	Me-dian (SD) =18.5, (6.4)											21.4( 9.4)		
Gorely, 2011 <sup>3</sup>	1	Girls	142	25.8 (5.6)									120	NR	26.7 (6.0)		NR
Gorely, 2011 <sup>3</sup>	2	Girls	160	Median (SD) =26.7, (5.6)									120	NR	28.0 (6.7)		
Body fat, summ of 4 SF measures																	
Gorely, 2011 <sup>3</sup>	1	Boys	137	19.1 (8.9)									120	NR	22.5(11.5) ;		NR
Gorely, 2011 <sup>3</sup>	2	Boys	150	Median (SD) =20.0, (8.5)									120	NR	23.9(13.1) ;		
Gorely, 2011 <sup>3</sup>	1	Girls	142	23.8 (10.3)									120	NR	26.1 (11.9)		NR
Gorely, 2011 <sup>3</sup>	2	Girls	160	Median (SD) =25.9, (11.2)									120	NR	28.3 (13.1)		

CI = Confidence Interval; N = Sample Size; NR = Not Reported; NS = Not Significant; SD = Standard Deviation; SE = Sample Error; WC = Waist Circumference

**Evidence Table 28c. Intermediate outcomes for combination diet and physical activity intervention studies taking place in a school setting with consumer health informatics components and in a school setting with home and consumer health informatics components**

Author, Year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Change in fruit and vegetable consumption</b>								
Spiegel, 2006 <sup>2</sup>	1							Post-data analysis showed an increase in fruit and vegetable consumption in both groups, with a notably higher increase in the intervention group. Although this increase was a positive shift, students were still reporting fruit consumption below recommended levels. There was a decrease in both groups in the reported consumption of potatoes and carrots. The comparison group also decreased reported rates of consumption of other vegetables and 100% fruit juices. Intervention teachers reported positive shifts in students' lunch and snack choices within 2 weeks of beginning the intervention. Students, teachers, and parents reported changes in the students' eating habits both at school and at home.
	2							
<b>Sugar Sweetend Beverages (usual, %&gt;400 ml/d</b>								
Ezendam, 2012 <sup>5</sup>	1	372	78.1	104	325	72.3		
	2	436	74.4	104	364	71.5		
<b>Snacks, pieces/d</b>								
Ezendam, 2012 <sup>5</sup>	1	363	5.2 (3.3)	104	318	5.8 (4.8)		
	2	432	5.5 (3.8)	104	359	5.3 (4.7)		
<b>Fruit, Pieces/d</b>								
Ezendam, 2012 <sup>5</sup>	1	372	1.63 (1.24)	104	330	1.46 (1.21)		
	2	442	1.67 (1.25)	104	371	1.48 (1.31)		
<b>Vegetable, g/d</b>								
Ezendam, 2012 <sup>5</sup>	1	378	106 (76)	104	330	105 (75)		
	2	443	107 (79)	104	375	106 (76)		
<b>Change in physical activity</b>								

Spiegel, 2006 <sup>2</sup>	1							The physical activity levels in the intervention group increased in both school and home settings. Physical activity activity rates were reported at the baseline measure point to be an average of 59 min/wk during the school day (averaging 11.8 min/d, with most of the activity occurring during PE class once a week) and a mean level of 22.34 min/d outside of the school day ( <i>N</i> :530). At post-data measure, intervention students reported an average of 102.5 min/wk of physical activity during the school day (20.5 min/d) and a mean level of 37.42 min/d outside of the school day ( <i>N</i> :531). Physical activity levels increased slightly in the comparison group in reported levels of light exercise (baseline level mean:2.74, <i>N</i> :472; post-data level mean: 3.09, <i>N</i> :473).
	2							
<b>Days with 60min of moderate activity</b>								
Ezendam, 2012 <sup>5</sup>	1	380	2.96 (1.90)	104	332	2.63 (1.95)		
	2	453	2.61 (1.92)	104	383	2.46 (1.90)		
<b>Transport to School (min/week)</b>								
Ezendam, 2012 <sup>5</sup>	1	117	156 (117)	104	329	132 (130)		
	2	137	131 (137)	104	382	161 (113)		
<b>Sport Outside School, % yes</b>								
Ezendam, 2012 <sup>5</sup>	1	393	89.3	104	394	82		
	2	466	81.8	104	453	76.4		
<b>Step Count, # of steps/week</b>								
Ezendam, 2012 <sup>5</sup>	1	99	84679 (21697)	104	68	68276 (27862)		
	2	128	81046 (28987)	104	105	78560 (253489)		
<b>Television + computer time, min/d</b>								
Ezendam, 2012 <sup>5</sup>	1	364	312.9 (163.9)	104	316	331.3 (161.7)		
	2	423	299.7 (163.6)	104	355	313.1 (155.6)		
<b>Steps per day</b>								
Gorely, 2011 <sup>3</sup>	1	279	10278.5 (3284.3)	121	215	13775.0 (3919.8)		
	2	310	9579.4 (2735.6)	130	206	14213.3 (3998.9)		
<b>MVPA Total</b>								
Gorely, 2011 <sup>3</sup>	1	279	120.3 (23.7)	121	215	114.1 (31.1)		
	2	310	124.7 (26.7)	130	206	128.3 (35.7)		

MVPA bouts								
Gorely, 2011 <sup>5</sup>	1	279	36.5 (16.4)	121	215	46.1 (23.2)		
	2	310	40.1 (18.7)	130	206	53.7 (28.8)		

d = Day, ml/d = milliliter per day; MVPA = Moderate to Vigororous Activity; N = Sample Size; PE = Physical Education; SD = Standard Deviation

## References, Key Question 1: School-consumer health informatics and school-home-consumer health informatics Settings

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**Key Question 2. Home-only.**

**Evidence Table 29. Study characteristics for studies taking place in a home only setting**

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance
Epstein, 2001 <sup>1</sup>  U.S.	NR	Randomized intervention	Age: 6 -11 years BMI: less than the 85th BMI percentile Participating child should have at least one parent with a BMI that was more than the 85th BMI percentile, one parent willing to attend treatment meetings, no family member on an alternative weight control program, no parent or child with current psychiatric problems, and no dietary or activity restrictions on the participating parent or child.	Yes
Lappe, 2004 <sup>2</sup>  US	NR	Randomized intervention	Age: 9 Female BMI: <85th percentile for age and sex Membership of Great Plains Girl Scout Council of greater Omaha; student in metropolitan area schools. Children with no history of the following: lactose intolerance, milk allergy, corticosteroid or anticonvulsant therapy, familial hypercholesterolemia, mental or physical handicaps, cancer, rheumatoid arthritis, asthma, or any other significant health problem reported by the parents were included. Girls with usual dietary intake of less than 1,100 mg of calcium per day were included. Also only the Girls who did not participate in organized team sports three or more times per week were included in an attempt to control for the effects of physical activity on bone health.	No/Not reported
French, 2011 <sup>3</sup>  US	NR	Randomized intervention	Eligibility was determined at the household level and households had to fit the following: Age: at least one child ages ≥5 years and two HH members ages ≥12 years; Residence in a private house or apartment within 20 miles of the university; HH TV viewing weekly average of ≥10 h per person; No HH members with dietary, medical, psychological, or physical limitations that would prevent their participation in intervention activities; and Willingness to be randomized to active intervention or control group.	Yes
Fitzgibbon, 2012 <sup>4</sup>  US	NR	Randomized intervention	Age: 3-5 years Grade: Pre-school Intervention was targeted towards Latino families, but Latino ethnicity was not cited as an explicit exclusion criterion	Yes

BMI = Body Mass Index; HH = Households; N = Sample Size; NR = Not Reported; S1 = Study 1



Evidence Table 30. Participant characteristics for studies taking place in a home only setting

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Epstein, 2001 <sup>1</sup>	26	52	Overall: (65) Arm1: Arm2: 7 Arm3: 10	Arm1: Arm2: 8.8 (1.8) Arm3: 8.6 (1.9)	NR	NR	No differences between groups for any of the baseline values were observed, except for more hypertension in families in the Decrease Fat and Sugar group (p<0.01).
Lappe, 2004 <sup>2</sup>	59	104	Overall: 59 (100) Arm1: 32 (100) Arm2: 27 (100)	Arm1: 9.5 (0.3) Arm2: 9.5 (0.4)	NR	NR	
French, 2011 <sup>3</sup>	90 households	52	NR (for children separately)	Age differs by group: no specifics were reported beyond:  In the 90 participating households, there were: 158 adults 75 adolescents between 12-17 84 children between 5-11, and 23 children <5 years	NR	NR	Note: baseline characteristics only provided on household level, not provided separately for adults and children.
Fitzgibbon,2012 <sup>4</sup>	146	52	Overall: 73(50) Arm1:35(47) Arm2:38(53)	Overall [months]: 54.2 (5.0 ) Arm1:54.7(5.1) Arm2:53.7(4.9)	Black, Non-Hispanic Overall:3 (2) Arm1:3(4) Arm2:0(0)  Latin Hispanic Overall:137 (94) Arm1:68(92) Arm2:69(96)  multiracial/other Overall:6(4) Arm1:3(4) Arm2:3(4)	Preschool: (100)	146 participants completed baseline assessment. 128 participants had complete followup data and were included in primary analysis.

BMI = Body Mass Index; N = Sample Size; NR = Not Reported; P = P-value

Evidence Table 31. Description of the interventions used in home only settings

Author, year	Arm	Description	Psycho-social Dietary Inter-vention	Physical/Environ-mental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environ-mental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
Epstein, 2001 <sup>1</sup>	2	Increase Fruit and Vegetable  Length of intervention, weeks: 26 weeks  Setting: Home (describe) : Take home child workbook; active parental involvement (parent-focused intervention)	The goal of the intervention was to incrementally increase intake of fruits and vegetables to reach at least two servings of fruits and three servings of vegetables per day.  Target: Child; parent  Delivery: Researcher Other : Parents  Comment: Participating parents and children attended the first meeting, at which they received the first modules in their parent and child workbooks. Child materials were sent home with the parents each week and included new workbook modules and		Parents were taught to increase access to physical activity.		Parents were taught to reduce access to sedentary behaviors.		

Author, year	Arm	Description	Psycho-social Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environ-mental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			program-related activities for the children to do with their parents. Children were reinforced for completing their program-related activities at home.						
Epstein, 2001 <sup>1</sup>	3	Decrease Fat and Sugar  Length of intervention, weeks: 26 weeks  Setting: Home (describe) :Take home child workbook ; active parent involvement (parent-focused intervention)	Participants in the decrease Fat and Sugar group were provided incremental goals to reach a goal of no more than 10 servings of high-fat/high-sugar foods per week.  Target: Child; parent  Delivery: Researcher Other : Parents		Parents were taught to increase access to physical activity.		Parents were taught to reduce access to sedentary behaviors		
Lappe, 2004 <sup>2</sup>	2	Calcium rich diet  Length of intervention, weeks: 104  Setting: Home (describe): the focus was on eating calcium rich food products.	Treatment group were asked to consume at least 1,500 mg calcium per day in their diet. The girls were allowed to eat calcium-fortified foods, but parents were						

Author, year	Arm	Description	Psycho-social Dietary Inter- vention	Physical/Environ- mental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environ-mental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			asked not to give them calcium supplements. At the first visit the girls and their parent(s) were taught about the calcium content of various foods, including calcium-fortified products. Participants were asked to track their intake every day to assure they met their goal of 1,500 mg. Families were instructed about foods naturally high in calcium and were educated frequently on new calcium-fortified products. Participants were asked to purchase foods with a high calcium content, either naturally high in calcium or calcium-fortified and were provided with a local supermarket “credit card” to cover the costs of calcium foods.						

Author, year	Arm	Description	Psycho-social Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>Target: Child Parent/Caregiver</p> <p>Delivery: Researcher</p> <p>Comment: Researchers also notified the parents when calcium fortification was removed from a food product.</p>						
French, 2011 <sup>3</sup>	2	<p>home-based intervention</p> <p>Length of Intervention (weeks): 52</p> <p>Setting: Home: TV watching, nutrition/eating behaviors, PA</p>	<p>Monthly group sessions (for HH members &gt;=12 years), behavioral strategies to promote behavior change, and home activities to reinforce behavioral messages from group sessions related to weight control</p> <p>Target: Family</p> <p>Delivery: Researcher, family members help each other</p> <p>Duration: monthly group sessions: 2 hours</p> <p>Frequency:</p>	<p>Intervention provided guidelines about HH food availability</p> <p>Target: Family :</p> <p>Delivery: Researcher, family members help each other</p> <p>Change in Intake: see notes</p> <p>Change in Calorie Intake: - limit availability of high Cal snack foods to one reg sized package per household member - replace 1/2 of high Cal prepackaged meals with lower Cal versions</p> <p>Comments: - make healthy choices when eating out, note for change in intake, intervention goals</p>	<p>Monthly group sessions (for HH members &gt;=12 years), behavioral strategies to promote behavior change, and home activities to reinforce behavioral messages from group sessions related to weight control</p> <p>Target: Family</p> <p>Delivery: Researcher, family members help each other</p> <p>Duration: monthly sessions: 2 hours each</p> <p>Frequency: monthly sessions: 1x/month for the first 6 mos.; home activities were included in the</p>	<p>Monthly group sessions included time for PA</p> <p>Target: Family</p> <p>Delivery: Researcher, family members help each other</p> <p>Duration: in the monthly group sessions, 20-30 min of PA were included</p> <p>Frequency: for the monthly sessions: 1 session/mo for the first 6 mos</p> <p>Comments: intervention goals included: - be physically active for a total of 30 min or more each day. [on an ind. level]</p>	<p>Target: Family</p> <p>Delivery: Researcher,</p> <p>Comments: intervention goals included: - reduce total household TV viewing time by 1/2. [on a HH level] - Limit TV viewing [on an ind. level], a TV limiting device was provided to limit TV viewing. Devices were programmed to allow only the number of hours of TV viewing that HHs selected as the weekly viewing limit. After the limit was reached, the TV was disabled until the start of the next week.</p>	<p>Intervention: general support</p> <p>Target: Parent/Caregiver, Family</p> <p>Delivery: Researcher</p> <p>Comments: monthly telephone support calls were made between sessions &amp; emails were used to maintain regular contact with intervention HHs. goal was to provide support, troubleshoot/problem solve and reinforcement for the behavioral changes being made.</p>	

Author, year	Arm	Description	Psycho-social Dietary Intervention	Physical/Environmental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
			<p>monthly sessions: 1x/month for the first 6 mos; home activities were included in the monthly newsletters (1/month)</p> <p>Comments: intervention goals included:</p> <ul style="list-style-type: none"> <li>- limit consumption of high cal snack foods to &lt;=1/day</li> <li>- replace 1/2 of high cal prepackaged meals with lower cal versions</li> <li>- limit sweetened drinks to &lt;=12 oz/day</li> <li>- eat at least 5 servings fruits &amp; veg each day</li> <li>- eat smaller portions ("eat less")</li> <li>- limit eating fast foods to &lt;=2/week</li> <li>- make healthy choices when eating out</li> </ul>	<p>included:</p> <ul style="list-style-type: none"> <li>- limit HH availability of sweetened drinks to &lt;=12 oz/person</li> <li>- serve smaller food portions</li> <li>- make at least 2 fruits and 3 vegetables available and visible in your home for each person</li> <li>- limit trips to fast food restaurants to &lt;=2x/week</li> </ul>	<p>monthly newsletters (1/month)</p> <p>Comments: intervention goals included:</p> <ul style="list-style-type: none"> <li>- encourage each other to do 30 min of activity daily. &amp; do some together. [on a HH level]</li> </ul>				
Fitzgibbon,2012 <sup>4</sup>	2	<p>Hip-hop intervention</p> <p>Length of Intervention (weeks): 14</p>	For child: classroom sessions included 20 min of nutrition instruction, which, combined with	<p>Creating a home environment to facilitate healthy choices</p> <p>Target: Parent/Caregiver :</p>	<p>For parent: interactive instruction on family exercise (and healthful eating)</p> <p>Target:</p>	<p>For child: classroom sessions included an aerobic activity component</p> <p>for parent: 30 min sessions additional to the interactive</p>	<p>Target: Child</p> <p>Comments: bilingual/bicultural educator, for child: was tied into the</p>		

Author, year	Arm	Description	Psycho-social Dietary Inter- vention	Physical/Environ- mental Dietary Intervention	Psychosocial Physical Activity/ Exercise Intervention	Physical/Environ-mental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
		Setting: School: classroom sessions Home: parent/family component (parent sessions)	the PA component below, was designed to target specific child behaviors (e.g. incr. FV and fiber consumption as well as duration & level of PA, decr. fat intake & TV viewing)  for parent: interactive instruction on healthful eating (and family exercise)  Target: Child Parent/Caregiver  Delivery: bilingual/bicultural educator  Duration: child: 20 min nutrition (with 20 min for PA below); parent: 60 min  Frequency: child: 3 sessions/wk for 14 weeks; parent: 1x week (6 total).	Comments: Parents also received weekly newsletters containing culturally adapted information that paralleled the 14 week school based curriculum	Parent/Caregiver  Duration: 60 min  Frequency: 1x/week 6 total	instruction of moderate PA  Target: Parent/Caregiver Child  Delivery: child: bilingual/bicultural educator; parent: NR  Duration: child: 20 min PA (with 20 min for nutr above); parent: 30 min session  Frequency: child: 3x week for 14 weeks; parents: 1x/week (6 total)	classroom sessions above.		

Ind = Individual; Hr = Hours; Mg = milligram; mo = Months; oz = ounce; reg = Regular; SCORES = America SCORES Bay Area

Evidence Table 32a. Weight related outcomes for diet intervention studies taking place in a home only setting

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
BMI (Kg/m2)																
Lappe, 2004 <sup>2</sup>	1	32	17 (3)									104	32	19 (3.3)		
	2	27	17 (2)									104	27	19 (2.8)		
Fat mass (kg)																
Lappe, 2004 <sup>2</sup>	1	32	8.6 (3.2)									104	32	11.4 (4.9)	33% Range: (0-139%)	
	2	27	7.9 (2.6)									104	27	10.7 (3.6)	38% Range: (6-75%)	
Weight (kg)																
Lappe, 2004 <sup>2</sup>	1	32	33.2 (6.7)									104	32	44.1 (9.9)	33% Range (16-72%)	
	2	27	32.2 (4.6)									104	27	42.9 (7.5)	34% Range (17-59%)	



Evidence Table32b. Intermediate related outcomes for diet intervention studies taking place in a home only setting

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Physical activity: number of hours during past week involved in each of 13 activities								
Lappe, 2004 <sup>2</sup>	1	32	NR	104 weeks	32	NR	12.5(4.6) hours per week	No sig. difference reported between groups. P-value not reported.
	2	27	NR	104 weeks	27	NR	15.7(8.0) hours per week	
Energy intake (kcal)								
Lappe, 2004 <sup>2</sup>	1	32	1841(296)	104 weeks	32	1853(371)	12	
	2	27	1873(338))	104 weeks	27	2003(339)	130	Treatment group had higher intake of energy than control group at f/u but this between group difference was not statistically analyzed.

**Evidence Table 33a. Weight related outcomes for combined diet and physical activity intervention studies taking place in a home only setting**

Bibliography	Arm	Baseline N	Baseline measure , mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure , mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure , mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure , mean (SD)	Mean Change from baseline (SD)	Measure of association
Prevalence of overweight																
Epstein, 2001 <sup>1</sup>	2	13	7.2 (6.0)	52 weeks			-1.10 (5.29)									p>0.05
Epstein, 2001 <sup>1</sup>	3	13	6.5 (8.0)	52 weeks			-2.40 (5.39)									
Prevalence of obesity																
Fitzgibbon,2012 <sup>4</sup>	1	74	15%					52								
Fitzgibbon,2012 <sup>4</sup>	2	72	28%					52								Baseline prevalence obesity for overall sample was 21%. At 52 week followup :15%
BMI-kg/m^2																
Fitzgibbon,2012 <sup>4</sup>	1	74	mean (SD) = 16.9(2.0) ;	14	72	16.9 (2.2)	0.09 (0.05)	52	67	16.2 (2.3)	-0.68 (0.10)					
Fitzgibbon,2012 <sup>4</sup>	2	72	mean (SD) =17.0, (1.9);	14	71	17.2 (2.3)	0.16 (0.05)	52	61	16.4 (2.5)	-0.51 (0.11)					Unadjusted between group difference at 14 weeks: 0.07 (95% CI: - 0.23 to 0.38); p>0.05 Adjusted between

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
																group difference at 14 weeks: -0.04(95% CI: -0.13 to 0.05)p>0.05 Unadjusted between group difference at 52 weeks: 0.17(95% CI:-0.45 to 0.80)p>0.05 Adjusted between group difference at 52 week followup = 0.22 (95% CI 0.02-0.41); p-value <0.05
BMI-z-score																
French, 2011 <sup>3</sup>	1	NR	mean (SD) = 0.76	52		mean (SD) = 0.67										
French, 2011 <sup>3</sup>	2	NR	mean (SD)= 0.71	52		mean (SD) = 0.69										Intervention effect on BMI z-score 0.0638; se=0.10; p-value = 0.53
Fitzgibbon,2012 <sup>4</sup>	1	74	mean	14	72		0.03	52	67		-0.54					

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
			(SD) = 0.83 (0.97)				(0.01)				(0.05)					
Fitzgibbon,2012 <sup>4</sup>	2	72	mean (SD) =0.96, (1.07)	14	71		0.00 (0.01)				-0.51 (0.05)					Adjusted between group difference in BMI z-score at 14 weeks: -0.03(95% CI: -0.13 to 0.06) p>-0.05; Adjusted between group difference in BMI z-score at 52 week followup= 0.07 (95% CI -0.03 to 0.17) p>0.05
Weight																
Fitzgibbon,2012 <sup>4</sup>	1	74	mean (SD) = 19.1 (3.4)	14	72		1.13 (0.22)	52	67		3.04 (0.18)					
Fitzgibbon,2012 <sup>4</sup>	2	72	median (SD) =19.2 (3.3)	14	71		1.66 (0.22)	52	61		3.61 (0.19)					Adjusted change in weight at 14 weeks: 0.53(95% CI: -0.83 to

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
																1.89); Adjusted change in weight at 52 week followup = 0.57 (95% CI - 0.55,1.68); p=>/=0.05

**Evidence Table 33b. Intermediate related outcomes for combined diet and physical activity intervention studies taking place in a home only setting**

Author, Year	Outcome	Arm	Baseline N	Baseline measure, mean (SD)	Final measure time point	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association	Notes
French, 2011 <sup>3</sup>	Moderate to vigorous Physical activity (minutes/day)	1		140.16	52		102.07			
		2		118.35	52		123.56		Estimate of intervention effect: 24.375(28.38) P=0.39	
French, 2011 <sup>3</sup>	Television viewing (hours per day)	1		2.71	52		1.93			
		2		2.89	52		2.08		Estimate of intervention effect: 0.1105(0.40) p=0.79	
Fitzgibbon,2012 <sup>4</sup>	Moderate to vigorous Physical activity (minutes/day)	1	28	98.8(38.7)	14	23	100.9(7.0)			
		2	42	90.6(24.9)	14	23	109.9(7.5)		Between group difference at 14 weeks: 9.02 (95%CI -35.1 to 53.2)	PA measured only at post - intervention period.
Fitzgibbon,2012 <sup>4</sup>	Screen time (hours per day)	1	64	3.0(1.6)	52		3.4(0.5)		Between group difference at 14 weeks: 0.26(95% CI: -0.58 to 1.10)	Screen time was similar between groups at post intervention and 52 week followup.
		2	60	3.2(1.7)	52		3.3(0.5)			
Epstein, 2001 <sup>1</sup>	Fruit and Vegetable Intake: servings per day	2	13	2.8(1.5)	52	13	3.52	0.72(1.11)		
		3	13	3.2(1.6)	52	13	2.65	-0.55(1.31)	P-value 0.12	
French, 2011 <sup>3</sup>	Fruit and Vegetable Intake (portions per day)	1		1.78	52		1.50			
		2		1.85	52		2.05		Estimate of intervention effect: 0.4658 (0.23), p = 0.05	
French, 2011 <sup>3</sup>	Sugar beverages (portions per day)	1		0.60	52		0.64			

Author, Year	Outcome	Arm	Baseline N	Baseline measure, mean (SD)	Final measure time point	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association	Notes
		2		0.46	52		0.53		Estimate of intervention effect: -0.0071 (0.16) P=0.96	
Fitzgibbon,2012 <sup>4</sup>	Energy intake (Kcal)	1	58	1336(481)	52		1339(12)			
		2	55	1340(481)	52		1313(12)		Between group difference at 14 weeks: -26.3 (95% CI -96.0 to 43.5)	Outcome measurements provided at 14 week (post-intervention) time point only. No statistically significant difference between groups at 14 or 52 week followup.
Fitzgibbon,2012 <sup>4</sup>	Fruit Intake: (servings per day)	1	58	1.1(1.2)	52		1.1(0.1)			
		2	55	0.7(0.9)	52		1.3(0.1)		Between group difference at 14 weeks: 0.28 (95%CI -0.36 to 0.92)	Outcome measurements provided at 14 week (post-intervention) time point only. No statistically significant difference between groups at 14 or 52 week followup.
Fitzgibbon,2012 <sup>4</sup>	Vegetable Intake: servings per day	1	58	1.1(0.9)	52		1.3(0.2)			
		2	55	1.4(1.5)	52		1.1(0.2)		Between group difference at 14 weeks: -0.18 (95%CI -1.35 to 0.99)	Outcome measurements provided at 14 week (post-intervention) time point only. No statistically significant difference between groups at 14 or 52 week followup.

## References, Key Question 2: Home-only Setting

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**Key Question 2. Home-primary care-CHI based.**

**Evidence Table 34. Study characteristics for studies taking place in a home setting with primary care and consumer health informatics components**

Author, year					
Location	Years of recruitment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Patrick, 2006 <sup>1</sup>	NR	Randomized intervention	Age: >11 - <15 Healthy adolescents	No/Not reported	

NR = Not Reported

**Evidence Table 35. Participant characteristics for studies taking place in a home setting with primary care and consumer health informatics components**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	RACE, N (%)	Grade level, N (%)	Comments
Patrick, 2006 <sup>1</sup>	878	52 weeks	Overall: 438 (49.9) Arm1: 216 Arm2: 222	Overall: 12.7 (1.3) Arm1: 12.6 (1.4) Arm2: 12.8 (1.3)	White, non-Hispanic Overall: 478 (58.4) Arm 1: 135 (62.5) Arm 2: 121 (54.4)  Black, non-Hispanic Overall: 54 (6.6) Arm 1: 6 (2.8) Arm 2: 19 (8.6)  Latino/Hispanic Overall: 107 (13.1) Arm 1: 28 (13) Arm 2: 33 (14.9)  Asian/Pacific Islander Overall: 26 (3.2) Arm 1: 2 (0.9) Arm 2: 9 (4.1)  American Indian/Alaska Native Overall: 6 (0.7) Arm 1: 2 (0.9) Arm 2: 2 (0.9)  Multiethnic or other Overall: 148 (18) Arm 1: 43 (19.9) Arm 2: 38 (17.2)  More non-white adolescents were randomized to the treatment group (45%) compared with the	NR	Data in Arm1 and Arm 2 for age and race/ethnicity were only for girls. Other data were for the entire sample.  878 Completed Baseline Assessment, but 59 Did Not Begin Intervention, so 819 Randomized and Began Intervention (data were reported for 819 subjects).

					control group (38%).		
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N = Sample Size; NR = Not Reported; SD = Standard Deviation

**Evidence Table 36. Description of the interventions used in home settings with primary care and consumer health informatics components**

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/enviromental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/enviromental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Patrick, 2006 <sup>1</sup>	2	<p>PACE+ intervention</p> <p>Setting: Home A printed manual to take home and 12 months of stage-matched telephone calls and mail contact and an intervention to help parents encourage behavior change attempts through praise, active support, and positive role-modeling. Primary care A computer-supported intervention initiated in primary health care settings + brief counseling Consumer health informatics telephone counseling</p>	<p>Summary: computer-based counseling+ brief provider counseling+16-section printed Teen Guide, mail, and telephone counseling</p> <p>Step 1: Aimed at Child: Computer-Based Expert Assessment for 2 nutrition target behaviors (total intake of fat, servings per day of fruits and vegetables), PA target behaviors (moderate and vigorous PA), and sedentary behaviors.</p> <p>Aimed at Provider: A Provider Summary highlighted patient-reported behaviors (both PA and nutrition), compared them with national guidelines, and displayed the behaviors the adolescent targeted for change. The Provider Summary alerted providers to areas of concern related to weight, disordered eating, or unwillingness to make changes</p> <p>Step 2: Aimed at child: Teen Guide was provided to the adolescent after provider visit, and each section</p>		<p>Step 1: Aimed at Child: Computer-Based Expert Assessment for 2 nutrition target behaviors (total intake of fat, servings per day of fruits and vegetables), PA target behaviors (moderate and vigorous PA), and sedentary behaviors.</p> <p>Aimed at Provider: A Provider Summary highlighted patient-reported behaviors (both PA and nutrition), compared them with national guidelines, and displayed the behaviors the adolescent targeted for change. The Provider Summary alerted providers to areas of concern related to weight, disordered eating, or unwillingness to make changes</p> <p>Step 2: Aimed at child: Teen Guide was provided to the adolescent after provider visit, and each section provided 2 to 3 pages of information on a specific target behavior or behavior change strategy (eg, decisional balance, self-</p>		<p>Target: Researcher</p> <p>Delivery: See previous information on intervention above.</p>		<p>Parents were also involved in the study. Meetings were organized whereby parents in the intervention group were given a file containing their child's screening results. Presentation on the importance of topics relevant to dietary and exercise habits of the children were issued. Parents were encouraged to modify their dietary habits as well as those of their children and support them in increasing their physical activity.</p>

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			<p>provided 2 to 3 pages of information on a specific target behavior or behavior change strategy (e.g., decisional balance, self-monitoring).</p> <p>Eleven telephone counseling calls were scheduled throughout the 1-year intervention period, each lasting 10 to 15 minutes. During the first 6 months, 5 intervention calls were directed at the nutrition and PA behaviors that the adolescent chose to target in the initial clinical visit. A call after the 6-month measurement visit used staging data gathered in that visit to develop new Progress Plans for the remaining 2 target behaviors. Five calls were then made over the next 6months directed primarily at the remaining 2 target behaviors. Counseling calls were structured interactions using the teen guide to help adolescents learn and apply relevant cognitive or behavioral change strategies to modify diet and PA behaviors.</p> <p>Target: Child Other: Provider</p> <p>Delivery: Researcher</p>		<p>monitoring).</p> <p>Eleven telephone counseling calls were scheduled throughout the 1-year intervention period, each lasting 10 to 15 minutes. During the first 6 months, 5 intervention calls were directed at the nutrition and PA behaviors that the adolescent chose to target in the initial clinical visit. A call after the 6-month measurement visit used staging data gathered in that visit to develop new Progress Plans for the remaining 2 target behaviors. Five calls were then made over the next 6months directed primarily at the remaining 2 target behaviors. Counseling calls were structured interactions using the teen guide to help adolescents learn and apply relevant cognitive or behavioral change strategies to modify diet and PA behaviors.</p> <p>Target: Child Other: Primary Care Provider</p> <p>Delivery: Researcher</p> <p>Duration: 10-15 minutes/call Frequency: 11 calls/year</p>				

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			Duration: 10-15 minutes/phone call Frequency: 11 calls/year  Comment: 3-5 minutes counseling after assessment; Study did not break out how much time was spent on dietary intake (vs. exercise)		Comment: Study did not break out how much time was spent on exercise (vs. dietary intake)				

PA = Physical Activity; PACE+ = Patient-centered Assessment and Counseling for Exercise + Nutrition

**Evidence Table 37a. Weight related outcomes for combination diet and physical activity intervention studies taking place in a home setting with primary care and consumer health informatics components**

Author, year	Arm	Base- line N	Baseline measure, mean (SD)	First follow- up time- point in weeks	N at first follow- up	First follow-up measure, mean (SD)	Mean change from base- line (SD)	Second follow- up time- point in weeks	N Second follow- up	Second follow-up measure, mean (SD)	Mean change from base- line (SD)	Final measure time- point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base- line (SD)	Measure of association
<b>BMI z-score</b>																
Patrick, 2006 <sup>†</sup>	1	395		26	369			52	334							
	2	424		26	390			52	356							No differences were found at 12 months between groups for BMI z scores, which were normed for age and sex in models controlling for baseline BMI z score, age and ethnicity (p >= 0.05) All analyses performed separately for boys and girls but data not reported for BMI z-score separately for boys and girls.

BMI = Body Mass Index; N = Sample Size; P = p-value; SD = Standard Deviation

**Evidence Table 37b. Weight related outcomes for combination diet and physical activity intervention studies taking place in a home setting with primary care and consumer health informatics components, subgroups**

Author, year	Arm	Sub-group	Base-line N	Baseline measure, mean (SD)	First followup time-point in weeks	N at first followup	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
<b>BMI z-score</b>																	
Patrick, 2006 <sup>†</sup>	1	BMI>/=95 <sup>th</sup> percentile	106		26				52		2.12(0.02)						
	2	BMI>/=95 <sup>th</sup> percentile	118		26				52		2.08(0.02)						Subgroup analysis performed on adolescents with BMI>/=95 <sup>th</sup> percentile (n=238) revealed no between group difference (p=0.10).

BMI = Body Mass Index; N = Sample Size; P = p-value; SD = Standard Deviation



**Evidence Table 37c. Intermediate outcomes for combination diet and physical activity intervention studies taking place in a home setting with primary care and consumer health informatics components**

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Percent Calories from fat (girls)</b>								
Patrick, 2006 <sup>1</sup>	1	216	33.3(7.2)	52 weeks	216	31.7(6.6)	-4.8%	
	2	222	32.6(5.5)	52 weeks	222	31.4(7.0)	-3.7%	p-value 0.86
<b>Percent Calories from fat (boys)</b>								
Patrick, 2006 <sup>1</sup>	1	179	32.3(6.2)	52 weeks	179	31.6(5.9)	-2.2%	
	2	202	32.6(5.7)	52 weeks	202	31.2(6.3)	-4.3%	p-value 0.31
<b>Fruit and vegetable intake: servings per day (girls)</b>								
Patrick, 2006 <sup>1</sup>	1	216	3.5(1.8)	52 weeks	216	3.9(1.7)	11.4%	
	2	222	3.5(1.5)	52 weeks	222	4.2(1.8)	20%	p-value 0.07
<b>Fruit and vegetable intake: servings per day (boys)</b>								
Patrick, 2006 <sup>1</sup>	1	179	3.7(1.6)	52 weeks	179	4.4(1.6)	20%	
	2	202	3.5(1.6)	52 weeks	202	4.2(1.7)	20%	p-value 0.49
<b>Sedentary behaviors: hours per day (girls)</b>								
Patrick, 2006 <sup>1</sup>	1	216	4.2(3.4)	52 weeks	216	4.4(3.7))	4.8%	
	2	222	4.3(3.4)	52 weeks	222	3.4(2.6)	-21%	p-value 0.001
<b>Sedentary behaviors: hours per day (boys)</b>								
Patrick, 2006 <sup>1</sup>	1	179	4.2(2.8)	52 weeks	179	4.3(3.5)	2.4%	
	2	202	4.2(3.7)	52 weeks	202	3.2(2.6)	-24%	p-value 0.001

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Physical activity: minutes per week of moderate + vigorous activity (girls)								
Patrick, 2006 <sup>1</sup>	1	216	284.3(45.8)	52 weeks	216	313.9(62.2)	10.4%	
	2	222	316.1(49.2)	52 weeks	222	324.6(61.5)	2.7%	p-value 0.90
Physical activity: minutes per week of moderate + vigorous activity (boys)								
Patrick, 2006 <sup>1</sup>	1	179	374.0(55.0)	52 weeks	179	419.8(79.2)	12.2%	
	2	202	418.4(54.5)	52 weeks	202	486.0(75.3)	16.2%	p-value 0.17

N = Sample Size; SD = Standard Deviation

## References, Key Question 2: Home-primary care-consumer health informatics Setting

1. Patrick K, Calfas KJ, Norman GJ *et al.* Randomized controlled trial of a primary care and home-based intervention for physical activity and nutrition behaviors: PACE+ for adolescents. Arch Pediatr Adolesc Med 2006; 160(2):128-36.PMID:16461867

Key Question 2. Home-school-community.

Evidence Table 38. Study characteristics for studies taking place in a home setting with school and community components

Author, year	Years of recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Gentile, 2009 <sup>1</sup>	NR	Randomized intervention	Grade: 3-5	Yes	
US					

NR = Not Reported

Evidence Table 39. Participant characteristics for studies taking place in a home setting with school and community components

Author, year	Total N	Follow-up Period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Gentile, 2009 <sup>1</sup>	1323	61 weeks	Overall: (53) Arm1: (49.6) Arm2: (56.0)	Overall: 9.6 (0.9) Arm1: 9.6 (0.9) Arm2: 9.6 (0.9)	90% White Non-Hispanic	3-5	992 participants included in the analysis at all three data collection time points.

N = Sample Size; NR = Not Reported; SD = Standard Deviation

**Evidence Table 40. Description of the interventions used in home settings with school and community components**

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/Environmental Physical Activity/ Exercise Intervention	Decrease Sedentary Behavior Intervention	Other Interventions	General Comments
Gentile, 2009 <sup>1</sup>	2	Switch Intervention  Length of intervention, weeks: 30  Setting: School: focus was on designed to reinforce the Switch messages and facilitate the family component of the intervention Home: Targets families as the primary leverage point. Parents influence eating behaviors by altering the types of food available in the home or restaurants, and the ways that food is prepared and consumed, also the PA is influenced by parents. Community or environment-level: focus was on promote awareness of the importance of healthy lifestyles.	The Switch program promoted healthy active lifestyles by encouraging students to 'Switch what you Do, Chew, and View'. The specific Chew goals to eat five fruits/vegetables or more per day. Study was not designed as a school-based (curricular) intervention.  Target: Child Parent/Caregiver  Duration: Over a period of 6-8 months		Family, school and community interventions aimed specifically at the 'Do' part of the switch intervention were to be physically active for 60 minutes or more per day.  Target: Child Parent/Caregiver  Delivery: Researcher  Duration: 60minutes Frequency: 7 Other: Over 6-8 months		Target: Researcher Delivery: The 'View' goals were to limit total ST (television and video game time) to 2 hours or fewer per day.		Training was provided to classroom teachers at each PAAC school in a six hour in-service at the beginning of each school year. The goal of in-service training was to develop competency and strategies to deliver 90 min of moderate to vigorous intensity, physically active PAAC lessons per week.

H = hour; PA = Physical Activity; PAAC = Physical Activity Across the Curriculum; ST = Sedentary Time

**Evidence Table 41a. Weight related outcomes for combination diet and physical activity intervention studies taking place in a home setting with school and community components**

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
BMI (Kg/m2)																
Gentile, 2009 <sup>1</sup>	1	674	18.5 (3.5)	34		19(0.03)		61		19.5 (0.1)						
Gentile, 2009 <sup>1</sup>	2	685	18.4 (3.3)	34		19(0.02)		61		19.4 (0.1)						Mean BMI values were not significantly different between treatment and control groups at both post-intervention and 6 months post-intervention (p >= 0.06).

**Evidence Table 41b. Weight related outcomes for combination diet and physical activity intervention studies taking place in a home setting with school and community components, subgroups**

Bibliography	Arm	Subgroup	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
BMI (kg/m2)																	
Gentile, 2009 <sup>1</sup>	1	Boys	337	18,6(3.4)	34				61		19.4						
	2	Boys	301	18.2(3.2)	34				61		19.1						There was a significant sex by treatment group interaction at 6 months post-intervention , t(1083) = 2.19, p<0.05.

**Evidence Table 41c. Intermediate outcomes for combination diet and physical activity intervention studies taking place in a home setting with school and community components**

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Screen time: hours per week								
Gentile, 2009 <sup>1</sup>	1	674	30.6(24.4)	61 weeks		29.1(0.9)	-1.5	
	2	685	28.6(22.5)	61 weeks		27.8(0.8)	-0.8	p-value >=0.5
Fruit and vegetable intake: servings per day								
Gentile, 2009 <sup>1</sup>	1	674	4.1(2.9)	61 weeks		4.0(0.1)	-0.1	
	2	685	4.9(3.2)	61 weeks		4.1(0.2)	-0.8	p-value <0.05
Physical Activity: Pedometer (steps per day)								
Gentile, 2009 <sup>1</sup>	1	674	11,594(2,993)	61 weeks		11,231(321)	-363	
	2	685	11,735(3,197)	61 weeks		11,442(425)	-293	p-value >=0.5

**References, Key Question 2: Home-school-community Setting**

1. Gentile DA, Welk G, Eisenmann JC *et al.* Evaluation of a multiple ecological level child obesity prevention program: Switch what you Do, View, and Chew. BMC Med 2009; 7:49.PMID:19765270

Key Question 3. Primary care-based.

Evidence Table 42. Study characteristics for studies taking place in a primary care setting

Author, year Location	Years of recruit ment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Polacsek, 2009 <sup>1</sup>  US	2006- 2006	quasi- experimental design	Age: >5 - <18	Yes	

Evidence Table 43. Participant characteristics for studies taking place in a primary care setting

Author, year	Total N	Follow-up period, weeks	Girls, n (%)	Age, Mean (SD) unless otherwise labeled	RACE, n (%)	Grade level, n (%)	Comments
Polacsek, 2009 <sup>1</sup>	539	78 weeks	NR	Sex differs by group: Arm 1: 5-11: 174 (57.1) 12-17: 130 (42.9) Arm 2: 5-11: 121 (51.6) 12-17 114 (48.4)		NR	539 parents completed the during-MYOC parent survey with an overall 97% response rate; 96% for intervention and 98% for control sites.



**Evidence Table 44. Description of the interventions used in primary care settings**

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Polacsek, 2009 <sup>1</sup>	2	<p>MYOC study</p> <p>Length of intervention, weeks: 78 weeks</p> <p>Setting: Primary care (describe): clinical decision support.</p>	<p>Targeting Primary Care Providers: Providers were encouraged and supported to routinely deliver 5-2-1-0 healthy lifestyle messages. The 5-2-1-0 behavioral goals include: encouraging &gt;5 servings of fruits and vegetables daily; limiting screen time to &lt;2 hours daily and; avoiding (0) sugar-sweetened beverages.</p> <p>Targeting families: Tools developed for the office visit include the 5-2-1-0 behavioral screening tool. The 5-2-1-0 behavioral goals include: encouraging &gt;5 servings of fruits and vegetables daily; limiting screen</p>	<p>Targeting Family through physician: Tools for clinicians included the Pediatric Obesity Clinical Decision Support Chart with an algorithm and guidelines for the prevention and management of overweight; guidelines for medical evaluation of overweight patients and hypertension management; reference laboratory values and blood pressure and BMI percentile charts; a discussion of limitations of the BMI; and guidelines for effective communication with families, including tips for brief, focused advice and brief negotiation around the 5-2-1-0 behavioral targets.</p> <p>Target: Primary care physician</p>	<p>Targeting Primary Care Providers: Providers were encouraged and supported to routinely deliver 5-2-1-0 healthy lifestyle messages. The 5-2-1-0 behavioral goals include: encouraging greater than 1 hour of physical activity daily.</p> <p>Targeting families: Tools developed for the office visit include the 5-2-1-0 behavioral screening tool. The 5-2-1-0 behavioral goals include: encouraging greater than 1 hour of physical activity daily.</p> <p>Target: Child Family Other : Primary Care Provider</p> <p>Delivery: Researcher Clinician</p> <p>Comment: Providers were targeted through learning sessions, bimonthly calls, site</p>	<p>Targeting Family through physician: Tools for clinicians included the Pediatric Obesity Clinical Decision Support Chart with an algorithm and guidelines for the prevention and management of overweight; guidelines for medical evaluation of overweight patients and hypertension management; reference laboratory values and blood pressure and BMI percentile charts; a discussion of limitations of the BMI; and guidelines for effective communication with families, including tips for brief, focused advice and brief negotiation around the 5-2-1-0 behavioral targets.</p> <p>Target: Primary care provider</p> <p>Delivery: Researcher</p>	<p>Target: Clinician</p> <p>Delivery: The 5-2-1 tool covers questions regarding TV and other screen time and whether a TV is in the room.</p>		

			<p>time to &lt;2 hours daily and; avoiding (0) sugar-sweetened beverages.</p> <p>Target: Child Family Other : Primary Care Provider</p> <p>Delivery: Researcher Clinician</p> <p>Comment: Providers were targeted through learning sessions, bimonthly calls, site visits, other communications and tools.</p>	Delivery: Researcher	visits, other communications and tools.				
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Evidence Table 45a. Weight related outcomes for combination diet and physical activity intervention studies taking place in a primary care setting

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
% or change in prevalence <pre>prevalence</pre>																
Polacsek, 2009 <sup>1</sup>	1(Pre-post study)	568	36.8%	78	568	38.9%										
Percent body fat																
Polacsek, 2009 <sup>1</sup>	1(Pre-post study)	600	19.75%	78	600	20.3%										

**Evidence Table 45b. Intermediate outcomes for combination diet and physical activity intervention studies taking place in a primary care setting**

Bibliography	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Percent of Parents reported setting a goal of >=5 fruits and vegetables per day								
Polacsek, 2009 <sup>1</sup>	2	378	NR	73 weeks		49%		N/A
Percent of Parents reported making nutrition changes								
Polacsek, 2009 <sup>1</sup>	2	378	NR	73 weeks		26%		N/A
Percent of Parents reported setting a goal of >=1 hour of physical activity per day								
Polacsek, 2009 <sup>1</sup>	2	378	NR	73 weeks		40%		N/A
Percent of Parents reported making physical activity changes								
Polacsek, 2009 <sup>1</sup>	2	378	NR	73 weeks		15%		N/A
Percent of Parents reported setting a goal of <=2 hours per day of screen time								
Polacsek, 2009 <sup>1</sup>	2	378	NR	73 weeks		38%		N/A
Percent of Parents reported making TV/screen changes								
Polacsek, 2009 <sup>1</sup>	2	378	NR	73 weeks		12%		N/A
Percent of Parents reported setting a goal of drinking no sugar-sweetened beverages.								
Polacsek, 2009 <sup>1</sup>	2	378	NR	73 weeks		32%		N/A
Percent of Parents reported making changes in sugar-sweetened beverages.								
Polacsek, 2009 <sup>1</sup>	2	378	NR	73 weeks		17%		N/A

## References, Key Question 3: Primary Care-only Setting

1. Polacsek M, Orr J, Letourneau L *et al.* Impact of a primary care intervention on physician practice and patient and family behavior: Keep ME HealthyΓÇöThe Maine Youth Overweight Collaborative. *Pediatrics* 2009; 123(Suppl):258-66.PMID:

<http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2010-01456-001&site=ehost-live>  
mpolacsek@mcph.org

Key Question 4. Child care-based.

Evidence Table 46. Study characteristics for studies taking place in a child care setting

Author, year Location	Years of recruit ment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Bayer, 2009 <sup>1</sup> Germany	NR	Randomized intervention	None listed	No/Not reported	
Fitzgibbon, 2006 <sup>2</sup> U.S.	1999	Randomized intervention	None listed	Yes	12 Head Start sites administered through the Archdiocese of Chicago were recruited. All children were eligible to participate in the intervention, but data were only collected on children whose parents provided informed consent.
Scheffler2007 <sup>3</sup> Germany	NR	Non-randomized intervention	Grade: Preschooler--- Nursery school	No/Not reported	
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup> Switzerland	Feb 2008- March 2008	Randomized intervention	Grade: pre-school  Children attending pre-school during the school year 2008-2009 in either the city of St. Gallen (German speaking) or Lausanne (French speaking)	Yes	

**Evidence Table 47. Participant characteristics for studies taking place in a child care setting**

Author, year	Total N	Follow-up period, weeks	Girls, n (%)	Age, Mean (SD) unless otherwise labeled	RACE, n (%)	Grade level, n (%)	Comments
Bayer, 2009 <sup>1</sup>	1340	78 weeks	Arm 1: (47.6) Arm 2: (36.2)	Arm 1: 6.12(0.42) Arm 2: 6.12(0.41)	NR	Kindergarten (100)	two samples – containing different children – were analyzed at time intervals of 5.7+-2.6 and 17.6 +- 2.3 months (mean+-standard deviation) after the start of the intervention.
Fitzgibbon, 2006 <sup>2</sup>	401	104 weeks	49.4% Arm1: (51.3) Arm2: (47.5)	4.3	81.4% Hispanic, 11.5% Black, 7.5% Multi-racial	Preschool	
Scheffler, 2007 <sup>3</sup>	264	104 weeks	NR	NR		NR	
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	652	52 weeks	Overall:50	Overall: 5.2(0.6)		NR	

Evidence Table 48. Description of the interventions used in child care settings

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Bayer, 2009 <sup>1</sup>	2	<p>"Tiger Kids" low cost behavioral intervention</p> <p>Length of intervention, weeks: 2</p> <p>"Kindergarten years"</p> <p>Setting: Child care (describe) : directly change health behavior on a daily basis in kindergarten</p> <p>Consumer health informatics (describe) : An internet platform with supporting information for Kindergarten teachers and families (www.tigerkids.de)</p>	<p>Intervention focused on modifying habits of food and drink consumption</p> <p>The nutritional target of the intervention was:</p> <p>1) regular consumption of fresh fruit and vegetables as a snack in the day care, aiming at replacing high energy density snack foods and establishing consumption of at least two portions/day of vegetables and fruits as a habit, and</p> <p>2) regular consumption of water and other non-sugared drinks (e.g. non-sugared fruit tea) in the day care, aiming at replacing sugared beverages and reaching a habitual consumption of not</p>	<p>A plate with fruits and vegetables offered throughout the day, in some kindergartens restricted to 1–2 h per day in order not to disturb other activities</p> <p>Target: Child</p>	<p>A folder for Kindergarten teachers with information materials and modules ready for use in the day-to-day activities of the Kindergarten (374 printed pages) and a CD with songs for use in the day care was produced, along with information materials for parents in the form of four newsletters/Kindergarten year and twelve "Tipp Cards" providing simple messages on health related behavior for parents, including physical activity-related messages. Examples of such messages include information on integrating regular physical activity in the daily routine of children and their families; encouragement of physically active leisure activities for families, and others</p> <p>Target:</p>	<p>Intervention focused on enhancing physical activity. The key target of the intervention was at least 30 min/day of playful and fun, vigorous physical activity games at the Kindergarten setting</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration frequency: At least 30 mins/day</p> <p>Frequency: Daily</p>		<p>Other (describe) : Change in home environment.</p> <p>Target: Child Parent/Caregiver</p> <p>Delivery: Teacher</p> <p>Duration frequency: "Cool Contracts" children selected a home environment change goal; role played how to ask their parents to participate in signing a contract to change the home environment, and completed a home environment change contract with their parents. Finally, after implementing environmental changes, the children again took pictures of their home and made a "HOP'N-at-Home" poster, which illustrated their home environmental changes.</p>	<p>The HOP'N intervention model included three levels: The FIRST LEVEL of intervention targeted the development of the community/government/human service agency (County Cooperative Extension office) to coordinate improving after-school programs. The SECOND LEVEL was then delivered by The Cooperative Extension office to the after-school staff. This level of intervention included three staff training sessions per year (six sessions total), staff monthly meetings with the Extension Assistant, and continuous web support. For the third level of intervention, the after-school staff and the Extension Assistant implemented the HOP'N after school quality elements at each intervention site. The after-school program at each site was approximately 2.5 hours per day. Every</p>



Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			<p>more than one glass/day of sugared drinks and juices.</p> <p>A folder for Kindergarten teachers with information materials and modules ready for use in the day-to-day activities of the Kindergarten (374 printed pages) and a CD with songs for use in the day care was produced, along with information materials for parents in the form of four newsletters/Kindergarten year and twelve "Tipp Cards" providing simple messages on health related behavior for parents. Information in the Tipp Cards included nutritional messages such as ways to encourage fruit consumption by attractive</p>		<p>Parent/Caregiver Family Educator</p> <p>Delivery: maybe researchers</p> <p>Other: four newsletters/Kindergarten year and twelve "Tipp Cards" providing simple messages on health related behavior for parents.</p>				<p>day, staff had the goal to implement 30 minutes of organized PA following the CATCH Kids Club PA principles [2]. The project provided the CATCH Kids Club curriculum box [10] and PA equipment. Also, after-school program staff was directed to work with their school's food service to provide FV with every snack. In addition to this "bottom-up approach", the County Extension Office worked with the school district food service to achieve the same FV goal. To assist the program staff, the research team provided a list of healthy snack ideas and content expertise. Snacks were not purchased for the program. Finally, also part of the third level of intervention, the HOP'N Club was a weekly social-cognitive-theory based curriculum delivered by the Cooperative Extension Assistant to each after-school intervention site for 60 minutes once a week.</p>

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			<p>presentation in small portions; attractive presentation of raw vegetable pieces as finger food; information on energy content of fruit, vegetables and energy dense snacks offered to children</p> <p>Target: Parent/Caregiver Family Educator</p> <p>Delivery: Teacher Other : maybe researchers</p> <p>Duration frequency: four newsletters/Kinder garten year and twelve "Tipp Cards" providing simple messages on health related behavior for parents</p> <p>Comment: At the start of the intervention, all teachers of participating day care centers were asked to participate in a</p>						<p>The curriculum was organized in a notebook form with weekly modules that included learning objectives, behavior change strategy goals, and implementation procedures and scripts. The HOP'N Club child behavioral goals were: Be physically active every day (30 minutes after-school, 60 minutes daily); eat FV at every meal or snack; drink less soda and juice drinks (drink water, no more than 1 can of soda or sm</p>

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			two-day training workshop in which they were introduced into the concept and practical application of the Tiger Kids program. A telephone hotline with the coordinating center at the Dr. von Hauner Children's Hospital, University of Munich was established for counseling of teachers and problem solving. At the start of the Tiger Kids program after the summer holidays, two information evenings were offered for parents at each Kindergarten setting to introduce the parents into the concepts, goals and practical aspects of the project, in collaboration with the health insurance AOK						

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			Bavaria. At the start of the second Kindergarten year after the onset of the intervention, the Kindergarten teachers were encouraged to continue using the program. During the second year the telephone hotline at the coordinating center was maintained, and one workshop was held to motivate the educators.						
Fitzgibbon, 2006 <sup>2</sup>	2	Weight control intervention  Length of intervention, weeks: 14 weeks  Setting: School (describe) : Diet and physical activity curriculum	Nutrition activity based on hand puppets that reflected the food pyramid (e.g., Miss Dairy, Mr. Fat, Miss Grain, etc.). Target behaviors for the intervention included increased fruit and vegetable consumption, decreased fat intake.  Target: Child  Delivery: Teacher  Duration		Physical activity curriculum to increase physical activity and aerobic activity that was not based on skill building but on overall moderate to vigorous movement.  Target: Child  Delivery: Teacher  Duration frequency: 20 minutes Frequency: 3 times weekly		Target: Teacher Delivery: Reducing screen time  Other: Parental involvement	Other (describe) : screening for overweight in children  Target: Parent/Caregiver Family  Delivery: Clinician  Comment: Flyers sent to parents explaining importance/consequences of overweight in children. Teachers informed of significance of overweight through sessions with study physician/dietician. Posters on prevention of obesity in young children were placed	I did not split the intervention into physical and nutritional because they were all combined in ten 20-min sessions. It might seem like there were ten 20-min sessions of nutritional education and another ten 20-min sessions for physical activity if split up. The only difference b/w arm 2 and arm3 is arm3 has a health piece for children.

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
			frequency: 20 minutes Frequency: three times weekly					around school. Parents of overweight/at-risk children were explained the importance of bringing the child to family physician. Physicians contacted to encourage follow-up care and invited to receive further training for treatment of obesity.	
Scheffler, 2007 <sup>3</sup>	2	Sport; ; Length of intervention, weeks: 104; ; Setting: School (describe): Playful athletic exercise program				Playful athletic exercise programs were designed. Teachers were also given additional training. The exercises targeted improving the pleasure of movement and train the motor basics like endurance, power, speed and skillfulness. Examples are running with a newspaper in front of breast without letting the paper fall down, jump from a chalk circle in to another one or balance on a line.; ; Target: Child; Educator; ; Duration frequency: 60minutes; Frequency: 3			
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Ballabeina intervention Length of Intervention (weeks): 44 weeks	Information sessions for children focusing on healthy nutrition. Every other week	Parents were given three information sessions that included promoting physical activity Target:	Parents were given three information sessions that included promoting physical activity Target:	Extra physical activity sessions, additional exercise equipment were provided. Target: Child Delivery: Teacher	Target: Parent/Caregiver Delivery: Teacher Comments: 3 times during intervention, how to reduce screen time at	Intervention: Sleep time Target: Child, Parent/Caregiver	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		Setting: School Home: PA sessions, information classes on HE, exercise equipment	children received nutritional activity cards to take home. Parents also received information sessions that included healthy nutrition. Target: Child, Parent/Caregiver Frequency: 22 sessions per 44 weeks	Parent/Caregiver Delivery: Teacher, Comments: Frequency (e.g., number of sessions per week), Parental information session also included healthy nutrition, media use (TV time) and sleep.	Parent/Caregiver Delivery: Teacher Frequency: 3 sessions during intervention Parental information session also included healthy nutrition, media use (TV time) and sleep.	Frequency: four sessions per week	home.		
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Ballabeina intervention Length of Intervention (weeks): 47 weeks Setting: School Home: PA sessions, information classes on HE, exercise equipment	Information sessions for children focusing on healthy nutrition. Every other week children received nutritional activity cards to take home. Parents also received information sessions that included healthy nutrition. Target: Child Parent/Caregiver Delivery: Teacher, Frequency: 22 sessions per 44 weeks	Parents were given three information sessions that included promoting physical activity Target: Parent/Caregiver Delivery: Teacher Parental information session also included healthy nutrition, media use (TV time) and sleep.	Parents were given three information sessions that included promoting physical activity Target: Parent/Caregiver Delivery: Teacher Frequency: 3 sessions during intervention Parental information session also included healthy nutrition, media use (TV time) and sleep.	Extra physical activity sessions, additional exercise equipment were provided. Target: Child Delivery: Teacher Frequency: four sessions per week	Target: Parent/Caregiver Delivery: Teacher Comments: 3 times during intervention, how to reduce screen time at home.,	Information regarding proper sleep was administered during information sessions (for parents) and during class time (for children)	
Metcalf, 2012 <sup>4</sup>	3	Ballabeina intervention Length of Intervention (weeks): 44	Information sessions for children focusing on healthy nutrition. Every	Parents were given three information sessions that included promoting physical activity	Parents were given three information sessions that included promoting physical activity	Extra physical activity sessions, additional exercise equipment were provided. Target: Child	Target: Parent/Caregiver Delivery: Teacher Comments: 3 times during intervention, how	Information regarding proper sleep was administered during information sessions (for parents) and during	

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/exercise intervention	Physical/environmental physical activity/exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
		weeks Setting: School Home: PA sessions, information classes on HE, exercise equipment	other week children received nutritional activity cards to take home. Parents also received information sessions that included healthy nutrition. Target: Child Parent/Caregiver Parent/Caregiver Teacher Frequency: 22 sessions per 44 weeks	Target: Parent/Caregiver Delivery: Teacher Parental information session also included healthy nutrition, media use (TV time) and sleep.	Target: Parent/Caregiver Delivery: Teacher Frequency: 3 sessions during intervention Parental information session also included healthy nutrition, media use (TV time) and sleep.	Delivery: Teacher Frequency: four sessions per week	to reduce screen time at home.	class time (for children)	

Evidence Table 49a. Weight related outcomes for physical activity intervention studies taking place in a child care setting, subgroups

Bibliography	Ar m	SG	Baseli ne N	Baselin e measur e, mean (SD)	First followu p timepoi nt in weeks	N at first followu p	First followup measure, mean (SD)	Mean change from baselin e (SD)	Second followu p timepoi nt in weeks	N Seco nd follo wup	Second followup measure, mean (SD)	Mean change from baselin e (SD)	Final measur e timepoi nt	N at final measur e	Final followu p measur e, mean (SD)	Mean Chang e from baselin e (SD)	Measure of associatio n
BMI (Kg/m2)																	BMI (Kg/m2)
Scheffler, 2007 <sup>3</sup>	1	Males	NR	NR					104	30	16.41(1.52) Median 16.01						NR
	2		NR	NR					104	27	16.60 (1.8) Median 16.56						NR
	1	Females	NR	NR					104	32	15.86 (1.47) median 15.50						NR
	2		NR	NR					104	38	16.10 (2.13) median 15.70						NR
% or change in prevalence[prevalen ce																	
Scheffler, 2007 <sup>3</sup>	1	Males	NR	NR	104	30	17.26 (4.09) Median 16.60										
	2		NR	NR	104	27	16.34(3.2 3) Median 16.00										
	1	Females	NR	NR	104	32	19.75 (3.85) Median 18.90										
	2		NR	NR	104	38	19.33 (5.31) Median 17.60										
Weight																	
Scheffler, 2007 <sup>3</sup>	1	Males	NR	NR					104-30	NR	21.33 (3.22) Median						



Bibliography	Arm	SG	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
											20.65						
	2		NR	NR					104-27	NR	21.59(3.10) Median 21.75						
	1	Females	NR	NR					104-32	NR	21(3.01) Median 20.90						
	2		NR	NR					104-38	NR	20.73(3.77) median 20						

**Evidence Table 49b. Clinical outcomes for physical activity intervention studies taking place in a child care setting**

Author, year	Arm	Subgroup	Baseline N	Baseline measure, mean SD)	Final measure timepoint	N at final measure	Final followup measure, mean SD)	Mean Change from baseline SD)	Measure of association
<b>DBP, mm Hg (During ergometric exposure)</b>									
Scheffler, 2007 <sup>3</sup>	1		104		104 weeks	62	68.8, SD 11.1		
	2		160		104 weeks	65	62.0, SD 11.2		
<b>DBP, mm Hg (1 min. after ergometric exposure)</b>									
Scheffler, 2007 <sup>3</sup>	1		104		104 weeks	62	68.1, SD 9.2		
	2		160		104 weeks	65	65.1, SD 9.4		
<b>DBP, mm Hg (3 min. after ergometric exposure)</b>									
Scheffler, 2007 <sup>3</sup>	1		104		104 weeks	62	67.6, SD 8.3		
	2		160		104 weeks	65	64.4, SD 9.4		

DBP = Diastolic blood pressure; mm Hg = millimeters of mercury; N = Sample Size; SD = Standard Deviation

Evidence Table 50a. Weight related outcomes for combination diet and physical activity intervention studies taking place in a child care setting

Bibliography	Ar m	Subgrou p	Baselin e N	Baselin e measur e, mean (SD)	First followup timepoin t in weeks	N at first followu p	First followu p measur e, mean (SD)	Mean change from baselin e (SD)	Second followup timepoin t in weeks	N Second followu p	Second followu p measur e, mean (SD)	Mean change from baselin e (SD)	Final measure timepoin t	N at final measur e	Final followu p measur e, mean (SD)	Mean Change from baselin e (SD)	Measure of associatio n
BMI (Kg/m2)																	BMI (Kg/m2)
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1		310	15.8 (1.6)	44	292	15.8 (1.7)									NR	
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2		342	15.6 (1.4)		333	15.7 (1.5)										
Fitzgibbon, 2006 <sup>2</sup>	1		199	17.5 (2.2)	52	160		0.48 (0.14)	104	160	0.70 (0.18)						-0.15 (-0.60- 0.29) p=.46
	2		202	17.0 (2.8)	52	176		0.33 (0.14)	104	171	0.46 (0.17)						-0.25 (-0.80- 0.31) p=0.34
BMI z score																	
Fitzgibbon, 2006 <sup>2</sup>	1		199	1.13 (1.06)	52	160		0.07 (0.09)	104	160	0.00 (0.09)						-0.08 (- 0.36-0.21) p=0.56
	2		202	0.87 (1.24)	52	176		0.00 (0.09)	104	171	-0.13 (0.09)						-0.13 (- 0.41-0.15) p=.34
Waist Circumferenc e (cm)																	
Metcalf, 2012 <sup>4</sup> Burgi,	1		310	52.8 (4.3)	44	292	54.3 (4.9)										

Bibliography	Arm	Subgroup	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
2012 <sup>5</sup>																	
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2		342	52.8 (4.2)	44	333	53.3 (4.1)										
Weight																	
Fitzgibbon, 2006 <sup>2</sup>	1		199	18.8 (3.8)	52	160		3.98 (0.20)	104	160		6.18 (0.32)					-0.14 (-0.76 to 0.48)
	2		202	18.6 (4.1)	52	176		3.84 (0.19)	104	171		5.91 (0.31)					-0.27 (-1.26 to 0.72)
Body Fat %																	
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1		310	23.6 (6.8)	44	292	24.1 (6.7)										
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2		342	23.7 (6.3)	44	333	23.2 (6.2)										
Body fat																	
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1		310	26.6 (9.2)	44	292	28.4 (11.1)										
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2		342	27.3 (8.1)	44	333	25.7 (7.5)										
Prevalence of																	

Bibliography	Arm	Subgroup	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Overweight</b>																	
Bayer, 2009 <sup>1</sup>	1	First sample (total n 1295)							78		18.0% CI: 14.6-21.8						Odds ratio 0.73(0.51-1.04) P=0.0535
	2								78		13.9% CI: 11.6-16.5						
	1	Second sample (total n 1326)							78		16.7% CI: 13.4-20.5						Odds ratio 0.89(0.66-1.22) P=0.5865
	2								78		15.6% CI: 13.2-18.2						
<b>Prevalence of obesity</b>																	
Bayer, 2009 <sup>1</sup>	1	First sample (total n 1295)							78		5.4% CI: 3.5-7.9						Odds ratio 0.58 (0.31-1.10) P=0.0745
	2								78		3.4% CI: 2.2-4.8						
	1	Second sample (total n 1326)							78		4.3% CI: 2.7-6.6						Odds ratio 0.79 (0.35-1.77) P=0.6346
	2								78		3.8% CI: 2.6-5.3						

Evidence Table 50b. Weight related outcomes for combined diet physical activity intervention studies taking place in a childcare only setting, by subgroup

Bibliography	Arm	Subgroup	Baseline N	Baseline measure, mean (SD)	First followup timepoint in weeks	N at first followup	First followup measure, mean (SD)	Mean change from baseline (SD)	Second followup timepoint in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
BMI																	
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Migrant	310	15.8 (1.7)	47	292	15.9 (1.7)										NR
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Migrant	342	15.8 (1.5)	47	333	15.9 (1.6)										
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Non Migrant	310	15.8 (1.4)	47	292	15.7 (1.3)										
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Non Migrant	342	15.4 (1.2)	47	333	15.3 (1.2)										Differences between intervention and control, after adjustment=-0.10 (95% CI -0.35-0.14) p-value = 0.402
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	MED/HIGH EDU	310	15.8 (1.5)	47	292	15.8 (1.6)										

Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	MED/HIGH EDU	342	15.6 (1.3)	47	333	15.5 (1.4)										Differences between intervention and control, after adjustment=-0.11 (95% CI -0.29-0.08) p-value = 0.235
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	LOW EDU	310	15.8 (1.9)	47	292	16.0 (1.9)										
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	LOW EDU	342	15.8, (1.6)	47	333	16.0 (1.6)										Difference between intervention and control after adjustment=-0.04 (95% CI -0.15-0.23) p-value = 0.677
Percent body fat																	
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Migrants	310	24.0 (6.9)	47	292	24.6 (7.0)										

Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Migrants	342	24.3%, (6.4)		333	24.0%(6.9)										Difference between intervention and control after adjustment, se=-1.14 (95% CI -2.06 - 0.22) p=0.015
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Non-migrant	310	22.1%(6.0)	47	292	21.1(5.0)										
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Non-migrant	342	22.4%, (5.7)		333	22.4(4.8)										Difference between intervention and control after adjustment, se=-1.42 (95% CI -2.54 - 0.30) p=0.013
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Med/High edu	310	23.2(6.6)	47	292	23.6(6.7)										

Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Med/High edu	342	23.3, (5.9)		333	22.4(5.8)										Difference between intervention and control after adjustment, se=-1.29 (95% CI -2.33- -0.26) p=0.015
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Low Edu	310	24.3(6.9)	47	292	54.7(5.3)										
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Low Edu	342	24.3, (6.9)		333	53.5(4.5)										Difference between intervention and control after adjustment, se=-0.43 (95% CI -1.63- 0.77) p=0.486
Waist circ (cm)																	
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Migrant	310	53.0(4.4)	47	292	54.6(5.0)										
Metcalfe, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Migrant	342	53.3, (4.5)		333	53.8(4.5)										Differences between intervention and



																	control after adjustme nt, se= - 1.02 (95% CI -1.69 - - 0.36) p=0.003
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Non- migrant	310	52.1(3.4)	47	292	53.3(4.0)										
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Non- migrant	342	51.9, (3.2)		333	52.2(2.9)										Differenc es between interventi on and control after adjustme nt, se= - 0.86 (95% CI -1.52 - - 0.21) p=0.010
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Med/High education	310	52.8(4.2)	47	292	54.3(4.9)										
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Med/High education	342	52.7, (3.9)		333	53.2(3.9)										Differenc es between interventi on and control after adjustme nt, se= - 0.87 (95% CI -1.46 - - 0.27)

																	p=0.004
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	1	Low education	310	53.2(4.4)	47	292	54.7(5.3)										
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	2	Low education	342	53.1, (4.7)		333	53.5(4.5)										Differences between intervention and control after adjustment, se= -1.10 (95% CI -2.0 - -0.20) p=0.017

\* Correlation between change in diet self-monitoring (GO foods)  
† Correlation between change in diet self-monitoring (WHOA foods)  
‡ Correlation between change in exercise self monitoring component of intervention

**Evidence Table 50c. Intermediate outcomes for combination diet and physical activity intervention studies taking place in a child care setting**

Author, Year	Outcome	Arm	Baseline N	Baseline measure, mean (SD)	Final measure time point	N at final measure	Final follow up measure, mean (SD)	Mean Change from baseline (SD)	Measure of association	Notes
Bayer, 2009 <sup>1</sup>	High Fruit consumption in 1 <sup>st</sup> sample	control			78 weeks		55.7% CI (51.0-60.3)			
		Intervention			78 weeks		66.6% CI (63.3-69.8)		Odds ratio; 1.64(1.26-2.12) P value <0.0001	Significant difference between intervention and control.
	High Fruit consumption in 2 <sup>nd</sup> sample	control			78 weeks		56.3% CI (51.6-60.9)			
		Intervention			78 weeks		66.7% CI (63.4-69.9)		Odds ratio; 1.59(1.26-2.01) P Value = 0.0002	Significant difference between intervention and control.
	High Vegetable consumption in 1 <sup>st</sup> sample	control			78 weeks		33.9% CI (29.6-38.5)			
		Intervention			78 weeks		38.6% CI (35.3-42.0)		Odds ratio;1.26 (0.98-1.61) P value= 0.0960	No Significant difference between intervention and control.
	High Vegetable consumption in 2 <sup>nd</sup> sample	control			78 weeks		33.6% CI (29.2-38.1)			
		Intervention			78 weeks		42.7% CI (39.4-46.1)		Odds ratio; 1.48 (1.08-2.03) P value= 0.0013	Significant difference between intervention and control.
Fitzgibbon, 2006 <sup>2</sup>	Nutritional intake; healthy eating habit	control	199		104 weeks				-0.25 (-2.32 to 1.83)	No Significant difference between intervention and control
		Intervention	202							
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	Nutritional intake; healthy eating habit	control	310		52 weeks				1.9 (1.02 to 3.6)	Significant difference between intervention and control. P=0.04
		Intervention	342							
Fitzgibbon, 2006 <sup>2</sup>	Physical activity minutes per day	control	199		104 weeks				10.8 (-2.56 to 24.12)	No Significant difference between intervention and control
		Intervention	202							
Metcalf, 2012 <sup>4</sup>	Physical activity	control	310		52 weeks				-12.3 (-51.5 to	No Significant difference

Burgi, 2012 <sup>5</sup>	minutes per day								26.9)	between intervention and control P=0.54
		Intervention	342							
Metcalf, 2012 <sup>4</sup> Burgi, 2012 <sup>5</sup>	Sedentary activity; Media use minutes per day	control	310		52 weeks				-13.4(-25.0 to -1.7)	Significant difference between intervention and control. P=0.03
		Intervention	342							

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**Key Question 5. Community-based, and community with additional components.**

**Evidence Table 51. Study characteristics for studies taking place in a community only setting**

Author, year	Years of recruitment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Eiholzer, 2010 <sup>1</sup>	NR	Randomized intervention	Boys only Membership of any of the Two teams of ice hockey-playing boys, GCK Lions or ZSC Lions in Zurich Switzerland.	No/Not reported	
Switzerland					

NR = Not Reported

**Evidence Table 52. Participant characteristics for studies taking place in a community only setting**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Eiholzer, 2010 <sup>1</sup>	46	52 weeks	NR	Arm1: 13.2 (0.6) Arm2: 13.4 (1)		NR	

NR = Not Reported

Evidence Table 53. Description of the interventions used in community only settings

Author, year	Arm	Description	Psycho-social dietary intervention	Physical/enviromental dietary inter-vention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Eiholzer, 2010 <sup>1</sup>	1	Usual care/no intervention							
	2	GCK lions group  Length of intervention: 16 weeks  Setting: Community or environ-ment level Focus was on High-Intensity Training exercises.				The resistance exercise program consisted of supervised 1-hour exercise sessions twice weekly (Tuesday, Thursday) for 12 weeks. The program consisted of 7 basic multiple-joints exercises training the main muscle groups (arm, 15 repetitions; leg, 15 repetitions; trunk, 25 repetitions); once weekly, the training loads were individually adapted to optimize strength and power gains  Target: Child  Duration: 60/session Frequency: 2		Goal setting  Target: Child  Delivery: Teacher  Duration: combined with psychosocial intervention targeting dietary intake.	After teachers were provided with preparatory teaching and classroom materials, they undertook special seminars that were designed and conducted to the intervention classes. In cooperation with the school directors, two 3 h seminars were performed by the authors. The aims of the seminars were: (i) to familiarize teachers with the objectives of the program and their role therein; and (ii) to increase teachers' awareness of the significance of incorporating health and nutrition in their curriculum.  The intervention itself was delivered by class home economics teacher supervised by a health visitor or a family doctor

h = hours

**Evidence Table 54a. Weight related outcomes for physical activity intervention studies taking place in a community only setting**

Author, year	Arm	Base-line N	Base-line mea-sure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up mea-sure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Sec-ond follow-up	Sec-ond follow-up mea-sure, mean (SD)	Mean change from baseline (SD)	Final mea-sure time-point	N at final mea-sure	Final follow-up mea-sure, mean (SD)	Mean Change from base-line (SD)	Measure of association
Percent body fat																
Eiholzer, 2010 <sup>1</sup>	1	21	7.20 (3.01)	17	21		0.39± 0.90	52	20		0.43± 1.40					
Eiholzer, 2010 <sup>1</sup>	2	25	7.34 (3.25)	17	25		0.65 ± 0.91	52	21		0.56 ± 1.62					

N = Sample Size; SD = Standard Deviation

**Evidence Table 54b. Intermediate outcomes for physical activity intervention studies taking place in a community only setting**

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Change in physical activity								
Eiholzer, 2010 <sup>1</sup>	1	20	0.97 (0.32)	12 mon	19	NR	-0.08 (0.35)	NR
	2	24	0.89 (0.22)	12 mon	20	NR	0.16 (0.31)	P=0.01

N = Sample Size; NR = Not Reported; P = p-value; SD = Standard Deviation

References, Key Question 5: Community-only Setting

1. Eiholzer U, Meinhardt U, Petro R, Witassek F, Gutzwiller F, Gasser T. High-intensity training increases spontaneous physical activity in children: a

randomized controlled study. J Pediatr 2010; 156(2):242-6.PMID:19846114

**Evidence Table 55. Study characteristics for studies taking place in a community setting with a school component**

Author, year Location	Years of Recruitment	Study Design	Inclusion Criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Chomitz, 2010 <sup>1</sup>  US	NR	Non-randomized intervention	Age: >5 at baseline - < 14 at follow-up Children must receive the full three years of the intervention. In addition, children must be >=5 years at baseline, <14 years at follow-up, and not have special needs that precluded measurement.	Yes	
Singh, 2009 <sup>2</sup>  Netherlands	NR	Randomized intervention	NR	Yes	No inclusion criteria or exclusion criteria were set for students to take part in the study.
Sallis, 2003 <sup>3</sup>  US	1997-1997	Randomized intervention	Middle school	No/Not reported	<p>The first 24 schools to indicate agreement (in response to an invitation to participate in the study) were accepted, randomized and included in the study.</p> <p>The researchers invited public middle schools (grades 6 to 8) to participate in the study.</p> <p>For intended follow-up: baseline was in spring 1999 school year and follow-up measures were at school year 2. Since 1 school year is approx. 8 months, 2 school years is 16 months or 69 weeks.</p>

NR = Not Reported; US = United States



Evidence Table 56. Participant characteristics for studies taking place in a community setting with a school component

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	RACE, N (%)	Grade level, N (%)	Comments
Chomitz, 2010 <sup>1</sup>	1858	156 weeks	Arm2: 895 (48.2)	Arm2: 7.7 (1.8)	White, non-Hispanic Arm 2: 693 (37.1)  Black, non-Hispanic Arm 2: 685 (37.3)  Latino/Hispanic Arm 2: 260 (14.0)  Asian/Pacific Islander Arm 2: 189 (10.2)  Overall: Arm 2: 31 (1.7)	NR	The following numbers of children were excluded from the analytic sample: 95 children due to biologically implausible BMI z-scores; 5 children due to missing fitness data at baseline or follow-up; 1,603 due to missing data at follow-up in year 4. The final analytic sample includes 1,858 children (52% of the initial eligible cohort).
Singh, 2009 <sup>2</sup>	1108	32- 80 weeks	Overall: 591 Arm1: 254 Arm2: 337	Overall:12.7		NR	
Sallis <sup>3</sup>	24 schools (mean enrollment 1109)	104 weeks	Overall: (49)	NR	White, Non-Hispanic  Overall: (39.5)	NR	

N = Sample Size; NR = Not Reported; SD = Standard Deviation

**Evidence Table 57. Description of the interventions used in community settings with a school component**

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/envirom-mental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/envirom-mental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Chomitz, 2010 <sup>1</sup>	2	<p>HLCK intervention</p> <p>Length of intervention, weeks: 156</p> <p>Setting: School: focused on PE and food service policies, systems and programs Community or environment-level focused on a supportive environment for healthy living choices.</p>	<p>To promote healthy living choices</p> <p>Target: Child Family</p> <p>Delivery: school; community-based organizations</p> <p>Comment: Community level: implementation strategies were designed to raise community awareness of the many resources available in the city to promote healthy eating and active living through a poster campaign, newsletters, 5-2-1 mini-grants. 5-2-1 guidelines promoted decreasing energy intake by promoting eating five or more servings of low-energy fruits and vegetables daily.</p> <p>School level: food service policies, systems, and programs were implemented at all 12 K-8 schools similarly to improve access to</p>	<p>To promote healthy living choices</p> <p>Target: Child</p> <p>Delivery: school</p> <p>Comment: School level: New guidelines and policies such as innovative food service projects such as new recipe and menu development and cafeteria taste-tests were developed to promote 5-2-1. School nutrition guidelines included restrictions on items sold in vending machines; limited access to a la carte foods; system-wide substitution of lower-sugar (&lt;6 g sugar) and/or higher-fiber (&gt;2 g fiber) cereals, whole grain breads (50–100% whole grain), and low-fat yogurt without artificial colors, and products with trans fat were phased out.</p>	<p>To promote an active lifestyle</p> <p>Target: Child Family</p> <p>Delivery: Teacher</p> <p>Other: community-based organizations</p> <p>Comment: Community level: implement-tation strategies were designed to raise community awareness of the many resources available in the city to promote active living through a poster campaign, newsletters, 5-2-1 mini-grants. 5-2-1 guidelines promoted increasing energy expenditure by limiting inactive or sedentary time to 2 h or less of TV or screen time daily (25); and increasing moderate and vigorous physical activity to at least 60 min of age-</p>	<p>to promote an active lifestyle</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Comment: School level: PE programs were implemented at all 12 K-8 schools similarly to improve access to appealing, appropriate physical activity opportunities for all children; and PE programs such as Project Adventure and ballroom dancing were developed to promote 5-2-1.</p>			

			<p>healthy food choices for all children.</p> <p>Individual/ Family level: Strategies and policies were designed to increase the awareness of children and their families of each student's health risk due to their BMI or fitness test scores, and to provide skills and resources for addressing individual and family health risks and lifestyle choices through school based family nights.</p>		<p>appropriate physical activity on all or most days of the week.</p> <p>Individual/ Family level: Strategies and policies were designed to increase the awareness of children and their families of each student's health risk due to their BMI or fitness test scores, and to provide skills and resources for addressing individual and family health risks and lifestyle choices through school based family nights.</p>				
Singh, 2009 <sup>2</sup>	2	<p>DOit</p> <p>Length of intervention, weeks: 32 weeks</p> <p>Setting: School: Educational program Community or environment-level: School canteen and physical activity options.</p>	<p>Abstracted from Singh, 2007<sup>4</sup>. Reduction in consumption of sugar-sweetened beverages and Reduction in consumption of high-sugar, high-fat-content snacks</p> <p>Target: Child</p> <p>Delivery: Teacher</p> <p>Duration: 2 fixed periods in 1 school year.</p>		<p>Classroom based educational program that covered 11 lessons for the subjects of biology and physical education. First part (BALANCE it, consisting of 6 lessons) aimed at raising awareness and information processing with regard to energy balance-related behaviors. Second part (CHOOSE it) aimed at facilitation of choice to improve 1 of the risk behaviors.</p> <p>Target: Child</p>	<p>School-specific advice on the selection of the school canteen and possible change options, Posters for the school canteen, and Financial encouragement of schools to offer additional physical activity options.</p> <p>Target: School policy</p> <p>Delivery: Researcher</p>	<p>Target: Teacher</p> <p>Delivery: Reduction in sedentary behavior and increase in active transport behavior</p> <p>Other: Videos, internet or CD-ROM</p>		<p>Intervention and control groups were further divided to obese and non-obese sub-groups and analyzed separately.</p>

					Delivery: Teacher				
					Duration: 2 fixed periods in 1 school year.				
Sallis <sup>3</sup>	2	<p>Environmental and Policy Interventions</p> <p>Length of Intervention (weeks): ~69</p> <p>Setting: School: Focused on a range of school activities/components including physical education classes, and all school food sources. However, there were no classroom health education</p> <p>Home: statewide regulatory changes to reduce sedentary behavior and promote healthy lifestyle; child care technical assistance; training around healthy habits</p> <p>Community: One of the interventions was an environmental intervention</p> <p>Aim at policy change: Yes</p>		<p>Nutritional interventions: The nutrition intervention was designed to provide and market low-fat foods at all school food sources. Intervention strategies for each food source are summarized in Table 2. Middle school cafeterias offer government-reimbursable (Type A) lunches and breakfasts, along with unregulated a la carte foods. Interventions with school food-service staff and managers were undertaken to provide more low-fat choices at these sources. An example of the food service strategy was to identify vendors who could provide schools with tasty, low-fat food items at competitive prices. About one third of students brought lunches from home, so intervention strategies were developed to assist students in bringing lower-fat lunches. At baseline, 6 of 12 intervention schools had stores that sold mostly high-fat foods, so this source was targeted for change. No schools had vending machines for students.</p> <p>Target: Child</p>		<p>Physical Activity Interventions: Physical education (PE) was required daily in all grades, and one intervention component was designed to increase physical activity in PE classes through changing lesson context, lesson structure, and teacher behavior. Another intervention component was intended to increase physical activity on campus during leisure periods throughout the school day when students could make choices (i.e., before school, after lunch, and after school). Consistent with baseline findings, targeted environmental changes were to increase supervision, equipment, and organized activities. Strategies used in the physical activity interventions are summarized in Table 1, organized by the structural ecologic model.</p> <p>Target: Child PE teachers, volunteer PA</p>			<p>Other aspects of the intervention included: HEALTH POLICY MEETINGS: Key school personnel met with project staff to select and implement policy changes to create healthier school environments (described in Zive et al.23). Participants included administrators (principals, food service directors); faculty (physical educators); staff (cafeteria managers, student body organization advisors); parents; and students. The project requested three, 90-minute meetings per school across 2 years, and 80% of planned meetings were held. Each intervention year, participants selected two to four policies to improve and formed action plans to achieve their goals. A manual guided the work of the groups. Example policies included “Serve 1% or skim milk only,” “Close school stores at lunch time,” “Provide supervision and transportation for student</p>

				<p>Change in Intake: Goals were to reduce fat content of all food offered through the school food service, food vendore, bagged lunches, and student stores.</p> <p>Comments: Child Nutrition services staff,</p>		<p>providers recruited from the community</p>			<p>physical activity after school,” and “Upgrade PE facilities and equipment.” The schools’ goals were printed on a poster-style newsletter distributed to staff at all intervention schools. Progress on goals was monitored in subsequent meetings.</p> <p><b>STUDENT HEALTH COMMITTEES:</b> Committees consisted of 9 to 12 students and were supervised by a faculty member and project staff. Members received T-shirts and training booklets describing how committees could support healthy policies and promote healthful choices. Student health committees were formed at 8 of the 12 intervention schools. The goal was to have a monthly activity, such as assisting with taste tests, announcing after-school activities, and creating posters promoting healthful lunch options.</p> <p><b>PARENTAL EDUCATION:</b> Parental education was delivered via existing school communication channels and was conceptualized as changing the information environment. Communications were</p>
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									made through school newsletters, posters, and a brochure at open houses and PTA meetings. Sixteen articles with strategies for improving students' dietary and physical activity habits at school were submitted to newsletter editors. Project staff made pres.
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BMI = Body Mass Index; HLCK = Healthy Living Cambridge Kids; K-8 = Kindergarten thru eighth grade; PE = Physical Education; Pres = President

**Evidence Table 58a. Weight related outcomes for combination diet and physical activity intervention studies taking place in a community setting with a school component**

Author, year	Arm	Base-line N	Base-line measure, mean (SD)	First followup time-point in weeks	N at first followup	First followup measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final followup measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
<b>BMI Change z score</b>																
Chomitz, 2010 <sup>1</sup>	2	1858	0.67 (1.06)	156	1858	0.63 (1.03)	-0.04									Difference in BMI Z-score between baseline and follow-up -0.04 P<0.001
<b>Prevalence of Obese</b>																
Chomitz, 2010 <sup>1</sup>	2	1858	20.2	156	1858	18	2.2									change in BMI percentile category from baseline to follow-up -2.2 P<0.05
<b>Prevalence of Overweight</b>																
Chomitz, 2010 <sup>1</sup>	2	1858	16.8	156	1858	17.4	0.6									Change in BMI percentile category from baseline to follow-up 0.6 P>=0.10

BMI = Body Mass Index; N = Sample Size; P = p-value; SD = Standard Deviation

**Evidence Table 58b. Weight related outcomes for combination diet and physical activity intervention studies taking place in a community setting with a school component, subgroups**

Author, year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second followup time-point in weeks	N Second follow-up	Second followup measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
<b>BMI kg/m2</b>																	
Singh, 2009 <sup>2</sup>	1	Girls	222	19.5 (3.4)	34	NR	20.0 (3.5)		52	NR	20.3 (3.4)		86	NR	20.9 (3.6)		b/w gp diff in change= -0.1 (-0.2 to 0.1) for 8 month f/u; b/w gp diff in change= 0.2 (-0.1 to 0.5) for 20 month f/u
	2		337	19.0 (3.0)	34	NR	19.5 (3.1)		52	NR	19.9 (3.2)		86	NR	20.2 (2.9)		
	1	Boys	254	19.0 (2.9)	34	NR	19.4 (2.9)		52	NR	19.8 (3.0)		86	NR	20.0 (2.7)		b/w gp diff in change= -0.1 (-0.2 to 0.1) for 8 month f/u; b/w gp diff in change= 0.2 (-0.1 to 0.5) for 20 month f/u
	2		295	18.2 (2.6)	34	NR	18.6 (2.8)		52	NR	19.1 (3.0)		86	NR	19.4 (2.9)		
Sallis <sup>3</sup>	1	Girls		Median (SD) = 19.52 (0.89)	104	NR	19.73 (1.16)										



	2	Girls		Median (SD) = 19.76 (0.77)	104	NR	19.88 (1.16)										
Sallis <sup>3</sup>	1	Boys		19.68 (0.63)	104	NR	20.04 (0.85)										
	2	Boys		20.12 (0.98)	104	NR	19.84 (0.61)										
<b>Sum of skinfold in mm</b>																	
Singh, 2009 <sup>2</sup>	1	Girls	222	55.1 (27.0)	34	NR	56.0 (26.8)		52	NR	54.6(22.4)		86	NR	68.7(28.7)		b/w gp diff in change= -2.3 CI: -4.3 to - 0.3 for 8 month f/u; b/w gp diff in change= -2.0 (-3.9 to -0.1) for 20 month f/u
	2		337	53.1(23.0)	34	NR	53.3(24.8)		52	nNR	52.0(20.7)		86	NR	64.2(21.9)		
	1	Boys	254	41.5(20.5)	34	NR	41.1(21.8)		52	NR	40.5(21.9)		86	NR	43.7(22.0)		b/w gp diff in change= -1.0 (-2.4 to 0.5) for 8 month f/u; b/w gp diff in change= -1.1 (-4.4 to 0.2) for 20 month f/u
	2		295	38.9(18.5)	34	NR	38.0(20.5)		52	NR	38.4(22.4)		86	NR	41.9(22.4)		
<b>Waist circumference (cm)</b>																	

Singh, 2009 <sup>2</sup>	1	Girls	222	67.2 (8.0)	34	NR	68.9 (8.1)		52	NR	68.7 (8.0)		86	NR	70.4 (8.4)		b/w gp diff in change= -0.4 (-0.8 to 0.2) for 8 month f/u; b/w gp diff in change= 0.9 (-1.1 to 0.6) for 20 month f/u
	2		337	65.7 (6.8)	34	NR	67.0 (6.8)		52	NR	67.3 (7.3)		86	NR	68.1 (6.8)		
	1	Boys	254	68.0 (7.5)	34	NR	68.9 (7.2)		52	NR	69.7 (7.5)		86	NR	72.8 (8.1)		b/w gp diff in change= -0.6 (-1.1 to -0.1) for 8 month f/u; b/w gp diff in change= 1.1 (0.1 to 2.0) for 20 month f/u
	2		295	66.1 (7.0)	34	NR	66.9 (6.8)		52	NR	68.3 (7.7)		86	NR	71.9 (7.6)		

b/w = between; BMI = Body Mass Index; diff = differences; f/u = follow-up; gp = group; kg/m<sup>2</sup> = kilogram per meter squared; N = Sample Size; NR = Not Reported; SD = Standard Deviation

**Evidence Table 58c. Intermediate outcomes for combination diet and physical activity intervention studies taking place in a community setting with a school component**

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
<b>Change in fitness test, mean number of tests passed</b>								
Chomitz, 2010 <sup>1</sup>	1	No control						
	2	1858	29.9	3 years	1858	44.5	NR	P < 0.001
<b>Active commuting to school, min/d</b>								
Singh, 2009 <sup>2</sup> Boys	1	222	34 (27)	20 mon	42 (28)	42 (28)	NR	NR
	2	295	385 (29)	20 mon	46 (32)	46 (32)	NR	NR
Singh, 2009 <sup>2</sup> Girls	1	254	33 (27)	20 mon	42 (28)	40 (28)	NR	
	2	337	39 (31)	20 mon	46 (32)	46 (32)		
<b>Change in SSB Consumption</b>								
Singh, 2009 <sup>2</sup> Boys	1	254	33 (27)	20 mon	42 (28)	40 (28)	NR	
	2	337	39 (31)	20 mon	46 (32)	46 (32)		
Singh, 2009 <sup>2</sup> Girls	1	254	1183 (922)	20 mon	42 (28)	763 (594)	NR	
	2	337	1124 (918)	20 mon	46 (32)	689 (538)	NR	
<b>Moderate to vigorous physical activity score</b>								
Sallis, 2003 <sup>3</sup>	1	12 schools	122 (31)	24 mon	12 schools	104 (19)	NR	
	2	12 schools	130 (48)	24 mon	12 schools	115 (25)	NR	P = 0.839
<b>Sedentary hours/day/student</b>								
Sallis, 2003 <sup>3</sup>	1	12 schools	4.68 (0.86)	24 mon	12 schools	3.87 (0.71)	NR	
	2	12 schools	4.65 (0.78)	24 mon	12 schools	4.42 (0.75)	NR	P = 0.693

min/d = minutes per day; mon = months; N = Sample Size; NR = Not Reported; SD = Standard Deviation; SSB = Sugar Sweetened Beverages

## References, Key Question 5: Community-school Setting

1. Chomitz VR, McGowan RJ, Wendel JM *et al.* Healthy Living Cambridge Kids: a community-based participatory effort to promote healthy weight and fitness. *Obesity (Silver Spring)* 2010; 18 Suppl 1:S45-53.PMID:20107461
2. Singh AS, Chin A Paw MJ, Brug J, van Mechelen W. Dutch obesity intervention in teenagers: effectiveness of a school-based program on body composition and behavior. *Arch Pediatr Adolesc Med* 2009; 163(4):309-17.PMID:19349559
3. Sallis JF, McKenzie TL, Conway TL *et al.* Environmental interventions for eating and physical activity: a randomized controlled trial in middle schools. *Am J Prev Med* 2003; 24(3):209-17.PMID:12657338

**Evidence Table 59. Study characteristics for studies taking place in a community setting with school and home components**

Author, year Location	Years of recruit ment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Economos, 2007 <sup>1</sup>  US	2002 (control groups only)	Non- randomized intervention	Eastern communities in Massachusetts were identified as eligible for participation based on socioeconomic status and racial-ethnic diversity. The first two socio-demographically matched cities that could provide a written commitment to participate were chosen as control communities (Control 1 and Control 2.	Yes	The level of the intervention was the community with one intervention community selected and 2 control communities.

US = United States

Evidence Table 60. Participant characteristics for studies taking place in a community setting with home and school components

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Economos, 20071	1178	43 weeks	NR	Arm1: 7.34 (0.944) Arm2: 7.92 (1.061) Arm3: 7.8 (1.047)  Control group 1 (arm 1) significantly differs in age from the intervention (arm 2) by t-test.	White, non-Hispanic Arm 1: (37.8) Arm 2: (49.6) Arm 3: (51.7)  Black, non-Hispanic Overall: Arm 1: (25.1) Arm 2: (7.5) Arm 3: (6.9)  Latino/Hispanic Overall: Arm 1: (11.8) Arm 2: (18.2) Arm 3: (22.8)  Asian/Pacific Islander Overall: Arm 1: (2.3) Arm 2: (9.1) Arm 3: (7.3)  Overall: Arm 1: (23) Arm 2: (15.6) Arm 3: (11.2)  Control group 1 (arm 1) significantly differed in ethnicity from the intervention group (arm 2) by chi-square test.	1st grade Arm 1:(47.4) Arm 2:(32.2) Arm 3:(43.5)  2nd grade Arm 1:(23.7) Arm 2:(29.6) Arm 3:(25.4)  3rd grade Arm 1:(28.9) Arm 2:(38.2) Arm 3:(31)  The percent of students in grades 1-3 differs significantly in control 1 (arm 1) from the intervention arm (arm 2) by chi-square test. The percent of students in first grade in control 2 (arm 3) differs significantly from the intervention arm (arm 2) by chi-square test.	The percent of students not overweight or obese is significantly higher in control 1 (arm 1) than the intervention (arm 2) (63.6% compared to 55.6%, respectively).  The percent of students where the primary home language is not English was significantly lower in control 1 (arm 1) compared to the intervention (arm 2) (15.9% compared to 33%, respectively.)

N = Sample Size; NR = Not Reported; SD = Standard Deviation

Evidence Table 61. Description of the interventions used in community settings with school and home components

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environ-mental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environ-mental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Economos, 2007 <sup>1</sup>	2	Shape Up Somerville (SUS)  Length of intervention, weeks: 43  Setting: School: Breakfast program; walk to school campaign; professional development for staff; school food service; classroom curriculum; Enhanced recess; school wellness policy development; after school SUS curriculum; walk from school campaign Home: Parent outreach and educational information; family events; nutrition forums; Child's health report card Community or environment-level: SUS Community Advisory Council; Ethnic-minority collaborations;	Targeting students: SUS classroom curriculum; cooking lessons; promotion of health snacks.  Targeting parents: nutrition forums, parent outreach and education  Targeting community members: city employee wellness campaign  Target: Child Parent/Caregiver Other: Community  Delivery: Researcher Teacher Other: community organizations  Comment: Additional information is provided here: <a href="http://nutrition.tufts.edu/research/shapeup">http://nutrition.tufts.edu/research/shapeup</a> . However, the duration and frequency is not clearly stated in the paper.	Targeting students: Breakfast program; School food service.  Targeting community members: Farmers market; SUS "approved restaurants"  Target: Child Other: Community  Delivery: Researcher Teacher Other: community organizations  Comment: Additional information is provided here: <a href="http://nutrition.tufts.edu/research/shapeup">http://nutrition.tufts.edu/research/shapeup</a> . However, change in intake is not clearly stated in the paper.	Targeting students: Walking contests; walk to/from school campaign; SUS classroom physical activity lesson; safe routes to school map.  Targeting community members: Walking trainings; resource guides for physical activity  Target: Child Other: community members  Delivery: Researcher Teacher Other: community based organizations  Comment: Additional information is provided here: <a href="http://nutrition.tufts.edu/research/shapeup">http://nutrition.tufts.edu/research/shapeup</a> . However, information on duration/frequency is not clearly stated in the paper.	Targeting children: enhanced recess; safe routes  Targeting community members: City ordinances on walkability/bike ability; 5K fitness fair.  Target: Child Other: Community  Delivery: Researcher Other: community organizations  Comment: Additional information is provided here: <a href="http://nutrition.tufts.edu/research/shapeup">http://nutrition.tufts.edu/research/shapeup</a> . However, information on duration/frequency is not clearly stated in the paper.	Other: Child's health report card		

		walking trainings; Farmers Market; City Employee Wellness Campaign; SUS approved restaurants; SUS 5K & Fitness fair; media placement; collaboration on health events.							
	3	Control 2							

SUS = Shape Up Somerville



Evidence Table 62a. Weight related outcomes for combined diet and physical activity intervention studies taking place in a community setting with school and home components

Author, year	Arm	Base-line N	Base-line mea-sure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up mea-sure, mean (SD)	Mean change from base-line (SD)	Sec-ond follow-up time-point in weeks	N Sec-ond follow-up	Sec-ond follow-up mea-sure, mean (SD)	Mean change from base-line (SD)	Final mea-sure time-point	N at final mea-sure	Final follow-up mea-sure, mean (SD)	Mean Change from base-line (SD)	Measure of association
BMI (Kg/m <sup>2</sup> )																
Economos, 2007 <sup>1</sup>	1	561														coefficient from regression model of change in BMI Z score pre and post-intervention At first follow-up = - 0.1307 CI: -01836 to - 0.0778, p=0.0203 At final follow-up= - 0.1048, p=0.0235
	2	385														

BMI = Body Mass IndexCI = Confidence Interval; kg/m<sup>2</sup> = kilogram per meter squared; N = Sample Size; P = p-value; SD = Standard Deviation

Evidence Table 62b. Weight related outcomes for combined diet and physical activity intervention studies taking place in a community setting with school and home components, subgroups

Author, year	Arm	Sub-group	Base-line N	Base-line measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
BMI Z score																	
Econom-os, 2007 <sup>1</sup>	1	Fe-males	298	0.617 (1.060)	43	298	0.615 (1.065)	-0.002									
	2		190	0.782 (1.1)	43	190	0.755 (1.070)	-0.027									
	3			0.679 (1.055)	34	117	0.688 (1.055)	0.009									
	1	Males	263	0.777 (0.999)	43	263	0.768 (0.995)	-0.009									
	2		195	0.918 (1.021)	43	195	0.882 (1.022)	-0.036									
	3			1.132 (0.903)	34	115	1.113 (0.926)	-0.018									

BMI = Body Mass Index; N = Sample Size; SD = Standard Deviation

References, Key Question 5: Community-school-home Setting

1. Economos CD, Hyatt RR, Goldberg JP *et al.* A community intervention reduces BMI z-score in children: Shape Up Somerville first year results. Obesity (Silver Spring) 2007; 15(5):1325-36.PMID:17495210

**Evidence Table 63. Study characteristics for studies taking place in a community setting with a home component**

Author, year Location	Years of recruitment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Robinson, 2010 <sup>1</sup>  US	NR	Randomized intervention	Girls only Age: >8 - <10 years BMI: >25 - <35 Black, non-Hispanic African American Not having a medical condition or not taking medications affecting their growth, not having a condition limiting their participation in the interventions or assessments, able to understand or complete the informed consent document, no plans to move from the area, not homeless and have television.	Yes	
Klesges, 2012 <sup>2</sup>		Randomized intervention	Girls only Age: >8 - <10 years BMI: >25 - <35 Black, non-Hispanic African American	Yes	

NR = Not Reported; US = United States

**Evidence Table 64. Participant characteristics for studies taking place in a community setting with a home component**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Robinson, 2010 <sup>1</sup>	261	104 weeks	Overall: 261 (100)	Overall: 9.4 (0.9) Arm1: 9.4 (0.8) Arm2: 9.5 (0.9)	Black, non-Hispanic Overall: 261 (100)	NR	
Klesges, 2012 <sup>2</sup>	303	104 weeks	Overall: 303 (100)	Overall: 9.3	Black, non-Hispanic Overall: 303 (100)	NR	

N = Sample Size; NR = Not Reported; SD = Standard Deviation

Evidence Table 65. Description of the interventions used in community settings with a home component

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Robinson, 2010 <sup>1</sup>	2	<p>GEMS Jewels and START</p> <p>Length of intervention, weeks: 104 weeks</p> <p>Setting: Home: home television reduction intervention Community or environment-level: after school dance sessions offered at community centers in selected neighborhoods.</p>				<p>Daily sessions lasted up to 2 1/2 hours and started with a 1-hour homework period and small snack followed by 45 to 60 minutes of learning and practicing dance routines. Three styles of dance were taught: traditional African dance, hip-hop, and step.</p> <p>Additional activities to maintain motivation included GEMS Jamboree dance performances approximately every 8 weeks for families and friends.</p> <p>Target: Child Family friends</p> <p>Delivery: female African American college students and/or recent graduates from the local community</p> <p>Duration: Two and a half hours Frequency: 5 days per week; 12 months per year.</p>	<p>Target: Other: Young adult, female, African American START mentors</p> <p>Delivery: Sisters Taking Action to Reduce Television (START) is a home-based screen time reduction intervention designed to incorporate African or African American history and culture,12 including up to 24 lessons during 2 years. Young adult, female, African American START mentors met with families in their homes to deliver each lesson</p> <p>Other: incentives/ motivations</p>		
Klesges, 2012 <sup>2</sup>	2	<p>Length of intervention, weeks: 104 weeks</p>	<p>Subjects are given practical experience with nutrition through interactive learning, as well as develop behavioral goals to eat a nutritional diet.</p>		<p>Subjects are given practical experience with physical activity through interactive learning, as well as develop behavioral goals to increasing physical activity.</p>		<p>Subjects set behavioral goals to reduce sedentary time</p>		

GEMS = Girls health Enrichment Multi-site Studies; START = Sisters Taking Action to Reduce Television

Evidence Table 66a. Weight related outcomes for combined diet and physical activity intervention studies taking place in a community setting with a home component

Author, year	Arm	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up mea-sure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up mea-sure, mean (SD)	Mean change from base-line (SD)	Final mea-sure time-point	N at final mea-sure	Final follow-up mea-sure, mean (SD)	Mean Change from base-line (SD)	Measure of association
BMI z-score																
Robison, 2010 <sup>1</sup>	1	127	20.68 (1.07)	52	NR	NR	0.24(0.19)									Adjusted difference in change per year: 0.02, 95% CI (-0.02 to 0.06)
	2	134	0.94 (1.07)	52	NR	NR	0.26(0.19)									Adjusted difference in change per year: 0.02, 95% CI (-0.02 to 0.06)
BMI																
Klesges, 2010 <sup>2</sup>	1	150	22.0 (5.7)	52	120	23.5 (0.14)						104	127	24.8 (0.19)		Diff(I-C): -0.06 95% CI (-0.87 to 0.75)
	2	153	21.7 (6.0)	52	110	23.6 (0.14)						104	116	24.7 (0.18)		Diff(I-C): -0.06 95% CI (-0.87 to 0.75)
Waist circumference, cm																
Klesges, 2010 <sup>2</sup>	1	150	71.8 (15.3)	52	120	76.0 (0.49)						104	127	79.7 (0.61)		Diff(I-C): -0.10 95% CI (-1.97 to 1.78)
	2	153	71.1 (15.4)	52	110	79.7 (0.61)						104	116	79.6 (0.60)		Diff(I-C): -0.10 95% CI (-1.97 to 1.78)
Body fat %																
Klesges, 2010 <sup>2</sup>	1	150	28.5 (13.2)	52	120	30.7 (0.39)						104	127	32.3 (0.29)		Diff(I-C): -0.10 95% CI (-1.32 to 1.16)
	2	153	28.0	52	110	30.3						104	116	32.2		Diff(I-C): -0.10

Author, year	Arm	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up mea-sure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up mea-sure, mean (SD)	Mean change from base-line (SD)	Final mea-sure time-point	N at final mea-sure	Final follow-up mea-sure, mean (SD)	Mean Change from base-line (SD)	Measure of association
			(11.5)			(0.38)								(0.41)		95% CI (-1.32 to 1.16)
<b>Fat free mass, kg</b>																
Klesges, 2010 <sup>2</sup>	1	150	29.8 (0.61)	52	120	33.9 (0.29)						104	127	37.2 (0.29)		Diff(I-C): 0.32 95% CI (-0.79 to 1.43)
	2	153	29.2 (6.5)	52	110	34.1 (0.25)						104	116	37.6 (0.28)		Diff(I-C): 0.32 95% CI (-0.79 to 1.43)
<b>Triceps skinfold thickness, mm</b>																
Klesges, 2010 <sup>2</sup>	1	150	18.9 (9.8)	52	120	22.5 (0.77)						104	127	27.0 (0.92)		Diff(I-C): -0.10 95% CI (-4.75 to 2.79)
	2	153	18.2 (8.5)	52	110	22.4 (0.76)						104	116	26.0 (0.91)		Diff(I-C): -0.10 95% CI (-4.75 to 2.79)
<b>Weight, kg</b>																
Klesges, 2010 <sup>2</sup>	1	150	44.0 (15.0)	52	120	52.0 (0.36)						104	127	58.3 (0.56)		Diff(I-C): -0.02 95% CI (-1.37 to 1.33)
	2	153	43.1 (15.5)	52	110	52.1 (0.36)						104	116	58.4 (0.55)		Diff(I-C): -0.02 95% CI (-1.37 to 1.33)

**Evidence Table 66b. Clinical outcomes for physical activity intervention studies taking place in a community setting with home components**

Author, year	Arm	Baseline N	Baseline measure, mean SD)	Final measure timepoint	N at final measure	Final followup measure, mean SD)	Mean Change from baseline SD)	Measure of association
<b>SBP</b>								
Robinson, 2010 <sup>1</sup>	1	127	mean : 98.31, SD : 10.62	24 months		mean : 1.03, SD : 4.71		
	2	134	mean : 98.09, SD : 9.30	24 months		mean : 1.24, SD : 4.74		
<b>DBP</b>								
Robinson, 2010 <sup>1</sup>	1	127	mean : 56.19, SD : 7.06	24 months		mean : 0.12, SD : 2.76		
	2	134	mean : 55.95, SD : 6.02	24 months		mean : -0.15, SD : 3.43		
<b>Total cholesterol</b>								
Robinson, 2010 <sup>1</sup>	1	127	mean : 175.85, SD : 31.17	24 months		mean : -4.18, SD : 6.88		
	2	134	mean : 171.49, SD : 30.50	24 months		mean : -7.35, SD : 6.97		
<b>HDL cholesterol</b>								
Robinson, 2010 <sup>1</sup>	1	127	mean : 57.05, SD : 13.56	24 months		mean : -3.28, SD : 3.32		
	2	134	mean : 54.15, SD : 11.73	24 months		mean : --3.26, SD : 3.21		
<b>LDL cholesterol</b>								
Robinson, 2010 <sup>1</sup>	1	127	mean : 106.42, SD : 28.44	24 months		mean : -1.06, SD : 5.81		
	2	134	mean : 103.94, SD : 26.23	24 months		mean : -3.90, SD : 7.20		
<b>Triglycerides, mg/dL</b>								
Robinson, 2010 <sup>1</sup>	1	127	mean : 61.82, SD : 25.40	24 months		mean : 1.01, SD : 10.14		
	2	134	mean : 66.93, SD : 37.06	24 months		mean : -1.73, SD : 20.68		
<b>Glucose, mg/dL</b>								
Robinson, 2010 <sup>1</sup>	1	127	mean : 84.88, SD : 6.60	24 months		mean : 1.53, SD : 3.96		

	2	134	mean : 84.99, SD : 7.42	24 months		mean : 1.81, SD : 3.80		
Insulin, mg/dL								
Robinson, 2010 <sup>†</sup>	1	127	mean : 9.77, SD : 6.95	24 months		mean : 2.83, SD : 4.92		
	2	134	mean : 10.97, SD : 11.17	24 months		mean : 1.61, SD : 5.01		

DBP = Diastolic blood pressure; HDL = High-density lipoproteins ; LDL = Low-desnsity lipoproteins; Mg/dL = milligram per deciliter; N = Sample Size; SBP = Systolic blood pressure; SD = Standard Deviation

References, Key Question 5: Community-home Setting

1.

Robinson TN, Matheson DM, Kraemer HC *et al.* A randomized controlled trial of culturally tailored dance and reducing screen time to prevent weight gain in low-income African American girls: Stanford GEMS. Arch Pediatr Adolesc Med 2010; 164(11):995-1004.PMID:21041592

2.

Klesges RC, Obarzanek E, Kumanyika S *et al.* The Memphis Girls' health Enrichment Multi-site Studies (GEMS): an evaluation of the efficacy of a 2-year obesity prevention program in African American girls. Arch Pediatr Adolesc Med 2010; 164(11):1007-14.PMID:21041593



**Evidence Table 67. Study characteristics for studies taking place in a community setting with home, primary care, and childcare components**

Author, year	Years of recruitment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
de Silva-Sanigorski, 2010 <sup>1</sup>	NR	Quasi-experimental design	Age: >0 - <5	Yes	
Australia					

NR = Not Reported

**Evidence Table 68. Participant characteristics for studies taking place in a community setting with home, primary care, and childcare components**

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
de Silva-Sanigorski, 2010 <sup>1</sup>	NR	208 weeks	NR	NR		NR	Based on the EPAQ data collected on a subset of the study population; In the intervention and comparison samples, respectively, participants in this component of the evaluation were aged 2.9 sd0.04 y and 2.8 sd0.03 y, were 51.2% and 49.5% female respectively.

EPAQ = Eating and Physical Activity Questionnaire; N = Sample Size; NR = Not Reported; SD = Standard Deviation

Evidence Table 69. Description of the interventions used in community settings with home, primary care, and childcare components

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/enviromental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/enviromental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
de Silva-Sanigorski, 2010 <sup>1</sup>	2	<p>Romp and Chomp intervention</p> <p>Length of intervention, weeks: 208 weeks</p> <p>Setting: Home: To increase awareness of key messages in homes Primary care: Dental health services, immunization services, community health service providers Child care: Preschools health promotions Community or environment-level: sociocultural and environmental changes</p> <p>Policy: Yes</p>	<p>To promote healthy eating; by significantly decreasing consumption of high sugar drinks and promoting consumption of water and milk; significantly decreasing consumption of energy-dense snacks and increasing consumption of fruit and vegetables. Series of posters, postcards, and brochures promoting overarching campaign and key messages.</p> <p>Target: Child Parent/Caregiver</p> <p>Delivery: Researcher Teacher Other: parents</p>	<p>Provision of water bottles and lunch bags for children attending kindergartens and other early childcare centers.</p> <p>Target: Child</p> <p>Delivery: Researcher</p>	<p>Active play workshops for early childhood staff. Active-play games were demonstrated in schools and community festivals and children and parents encouraged participating. Active-play media release. Promotional materials (e.g., balloons, stickers, posters, postcards, etc.) produced and distributed.</p> <p>Target: Child Parent/Caregiver</p> <p>Delivery: Researcher Teacher Other: parents</p>	<p>To increase structured active play in kindergarten and day care.</p> <p>Target: Child</p> <p>Delivery: Researcher</p>	<p>Target: Researcher Teacher Other: Parents</p> <p>Delivery: To significantly increase home/family-based active play and decrease television-viewing time. Through the development and distribution of posters and postcards.</p>		

**Evidence Table 70a. Weight related outcomes for combination diet and physical activity intervention studies taking place in a community setting with home, primary care, and childcare components**

Author, year	Arm	Sub-group	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
de Silva-Sanigorski, 2010 <sup>1</sup>	1	2 year old	17732	16.60 (SE : 0.01)	52 weeks	21911	16.57 (0.01)										coefficient from regression model of change b/w groups =-0.02 (-0.06, 0.01; p>=0.05), after adjusting for age, sex and height; results from multiple c/s data
	2		1587	16.84 (0.04)	52 weeks	1611	16.77 (0.04)										
de Silva-Sanigorski, 2010 <sup>1</sup>	1	3.5 year old	14647	16.20 (0.01)	52 weeks	19050	16.17 (0.01)										coefficient from regression model of change b/w groups = -0.06 (-0.10, -0.01; p<0.01), after adjusting for age, sex and height; results from multiple c/s data
	2		1191	16.35(0.05)	52 weeks	1239	16.17 (0.04)										

b/w = between; BMI = Body Mass Index; c/s = clinical studies; Kg/m<sup>2</sup> = kilogram per meter squared; N = Sample Size; P = p-value; SD = Standard Deviation; SE = Sample Error

**Evidence Table 70b. Weight related outcomes for combination diet and physical activity intervention studies taking place in a community setting with home, primary care, and childcare components, subgroups**

Author, year	Arm	Sub-group	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
Weight in Kg																	
de Silva-Sanigorski, 2010 <sup>1</sup>	1	2 year old	17732	13.07(0.01)	52 weeks	21911	13.04(0.01)										coefficient from regression model of change b/w groups = - 0.02 (-0.04, 0.01; p>=0.05), after adjusting for age, sex and height; results from multiple c/s data
	2		1587	13.25(0.04)	52	1611	13.09(0.04)										
	1	3.5 year old	14647	16.89(0.02)	52	19050	16.86(0.02)										coefficient from regression model of change b/w groups = - 0.06 (-0.10, -0.02; p<0.05), after adjusting for age, sex

Author, year	Arm	Sub-group	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
																	and height; results from multiple c/s data
	2		1191	17.05(0.07)	52	1239	16.76(0.07)										
% Overweight/ Obese																	
de Silva-Sanigorski, 2010 <sup>1</sup>	1	2 year old	17732	13.2(0.3)	52 weeks	21911	12.59(0.2)										coefficient from regression model of change b/w groups = - 0.06 (-0.12, -0.01; p<0.05), after adjusting for child age, sex, and maternal educational level; results from multiple c/s data
	2		1587	17.1(1.0)	52 weeks	1611	14.6(0.9)										
	1	3.5 year old	14647	16.4(0.3)	52 weeks	19050	15.7(0.3)										coefficient from regression model of change b/w groups = - 0.08 (-0.14, -0.12; p<0.05),

Author, year	Arm	Sub-group	Base-line N	Baseline measure, mean (SD)	First follow-up time-point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from base-line (SD)	Second follow-up time-point in weeks	N Second follow-up	Second follow-up measure, mean (SD)	Mean change from base-line (SD)	Final measure time-point	N at final measure	Final follow-up measure, mean (SD)	Mean Change from base-line (SD)	Measure of association
																	after adjusting for child age, sex, and maternal educational level; results from multiple c/s data
	2		1191	18.6(1.2)	52 weeks	1239	15.2(0.1)										

b/w = between; BMI = Body Mass Index; c/s = clinical studies; Kg = kilogram; N = Sample Size; P = p-value; SD = Standard Deviation

Evidence Table 70c. Intermediate outcomes for combination diet and physical activity intervention studies taking place in a community setting with home, primary care, and childcare components

Author, year	Arm	Baseline N	Baseline measure, mean (SD)	Final measure timepoint	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of association
Change in fruit or vegetables								
de Silva-Sanigorski, 2010 <sup>†</sup>	1	799		12 mon	696	NR	NR	NR
	2	950	1.07 (0.02)	12 mon	377	NR	0.41 (0.30, 0.51)	P <0.001
de Silva-Sanigorski, 2010 <sup>†</sup>	1	799		12 mon	696	NR	NR	NR
	2	950	1.29 (0.02)	12 mon	377	NR	0.52 (0.42, 0.61)	P <0.001

mon = months; N = Sample Size; NR = Not Reported; P = p-value; SD = Standard Deviation

References, Key Question 5: Community-home-primary care-child care Setting

1. de Silva-Sanigorski AM, Bell AC, Kremer P *et al.* Reducing obesity in early childhood: results from Romp & Chomp, an Australian community-wide

intervention program. Am J Clin Nutr 2010; 91(4):831-40.PMID:20147472

Evidence Table 71. Study characteristics for studies taking place in a community setting with school, primary care, and childcare components

Author, year Location	Years of recruitment	Study design	Inclusion criteria	Goal of study is obesity prevention/ weight maintenance	Comments
Chang, 2010 <sup>1</sup>  US	2004-2015	Quasi experiment	Age: 0-17 years	Yes	Data for evaluation of the program was collected from three resources:  1) Nemour's State wide Delaware survey of children health 2) Nemour's Health System electronic medical record (EMR) 3) State department of Education's Fitnessgram.

EMR = Electronic Medical Record; US = United States



Evidence Table 72. Participant characteristics for studies taking place in a community setting with school, primary care, and childcare components

Author, year	Total N	Follow-up period, weeks	Girls, N (%)	Age, Mean (SD) unless otherwise labeled	Race, N (%)	Grade level, N (%)	Comments
Chang <sup>1</sup>	2202	NR	NR	NR	White, Non-Hispanic, Arm1:(35.9) Arm2:(35.4) Arm3:(22.9) Arm4:(38) Arm5:(37.3)  Black, Non-Hispanic Arm1:(43.5) Arm2:(40.7) Arm3:(42.7) Arm4:(39.7) Arm5:(56.8)  Other Overall: all other Including Hispanics Arm1:(36.1) Arm2:(32.2) Arm3:(41.9) Arm4:(34.4) Arm5:(43.5)	NR	Intervention components delivered in various sectors vary in regards to start date and end date. Many are ongoing at the time of publication.

N = Sample Size; SD = Standard Deviation

Evidence Table 73. Description of the interventions used in community settings with school, primary care, and childcare components

Author, year	Arm	Description	Psychosocial dietary intervention	Physical/environmental dietary intervention	Psychosocial physical activity/ exercise intervention	Physical/environmental physical activity/ exercise intervention	Decrease sedentary behavior intervention	Other interventions	General Comments
Chang <sup>1</sup>	2	<p>Nemour's Statewide Multi-sector Strategy</p> <p>Length of Intervention (weeks): NR (see comment below)</p> <p>Setting: School: wellness programs; assessment of student fitness; physical education/activity</p> <p>Primary Care: Implementation of Expert Committee recommendations on assessment, prevention and treatment of child and adolescent overweight</p> <p>Community: implementation of policy and practice changes with organizations such as YMCA Child care</p> <p>Aim at policy change: Yes</p>	<p>Nemours developed a prescription which was easy to remember for a healthy lifestyle- "5-2-1 almost none" based on research, expert advice and similar health campaigns. This was implemented throughout various sectors. The prescription encourages children to eat at least 5 servings of fruits and vegetables and to consume almost no sugar-sweetened beverages.</p> <p>Social marketing campaign deployed through media, events and programmatic work focused on children and families' adoption of 5-2-1 almost none.</p> <p>Target: Child Family</p> <p>Delivery: Multi-sector delivery system,</p>						Intervention components occurring in various sectors vary in regards to start and end date. Many are ongoing at the time of publication.

NR = Not Reported; YMCA = Young Men’s Christian Association

Evidence Table 74. Weight related outcomes for diet only intervention studies taking place in a community setting with school, primary care, and childcare components

Author, year	Arm	Subgroup	Baseline N	Baseline measure, mean (SD)	First follow-up time- point in weeks	N at first follow-up	First follow-up measure, mean (SD)	Mean change from baseline (SD)	Second followup time- point in weeks	N Second followup	Second followup measure, mean (SD)	Mean change from baseline (SD)	Final measure time- point	N at final measure	Final followup measure, mean (SD)	Mean Change from baseline (SD)	Measure of associa- tion
Obesity Prevalence (%)																	
Chang, 2010 <sub>1</sub>	1	2202	mean (SD) = 17 %					104		mean (SD) = 17 %							
Overweight Prevalence (%)																	
Chang, 2010 <sub>1</sub>	1	2202	mean (SD) = 20.6 %					104		mean (SD) = 24.2 %							
Chang, 2010 <sub>1</sub>	2	2202	mean (SD) = 40.7 %					104		mean (SD) = 48.9 %							
Chang, 2010 <sub>1</sub>	3	2202	mean (SD) = 42.7 %					104		mean (SD) = 52 %							
Chang, 2010 <sub>1</sub>	4	2202	mean (SD) = 39.7 %					104		mean (SD) = 45%							
Chang, 2010 <sub>1</sub>	5	2202	mean (SD) = 56.8 %					104		mean (SD) = 54%							

N = Sample Size; SD = Standard Deviation

References, Key Question 5: Community-school-primary care-child care Setting

1. Chang DI, Gertel-Rosenberg A, Drayton VL, Schmidt S, Angalet GB. A statewide strategy to battle child obesity in Delaware. Health Aff (Millwood) 2010; 29(3):481-90.PMID:20194990

## Appendix F. Strength of the Evidence

Strength of Evidence Table 1. Weight related outcomes

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE
School only	D, 2	1995-2012	1,782	0/2/0	50	100	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate
	PA, 15	1993-2011	10,086	0/13/2	26	73	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate
	C, 37	1985-2012	41,875	2/27/8	45	54	Low	Inconsistent	Imprecise	Direct	No conclusion, inconsistent results	Insufficient
School-Home	D, 1	1986	1,321	0/1/0	100	100	Moderate	NA	Precise	Direct	Not enough evidence to reach conclusion	Insufficient
	PA, 3	1999-2010	1,654	1/2/0	100	100	Moderate	Consistent	Precise	Direct	Benefit	High
	C, 26	1991 - 2012	25,438	2/20/4	39	81	Moderate	Consistent	Precise	Direct	Benefit	Moderate
School-Home-Community	PA,1	2010	2,829	0/1/0	0	0	Moderate	NA	Precise	Direct	Not enough evidence to reach conclusion	Insufficient
	C,8	2008-2012	11,525	1/4/3	12	81	Moderate	Consistent	Imprecise	Direct	Benefit	High
School-Community	D,1	2009	2,950	0/1/0	100	100	Moderate	NA	Precise	Direct	Not enough evidence to reach conclusion	Insufficient
	PA,1	2008	1,721	0/0/1	0	0	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C,4	1997-2012	3,017	0/2/2	25	75	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate
School-CHI	PA,2	2007-2012	1,335	0/2/0	0	0	Moderate	Inconsistent	Imprecise	Direct	No conclusion, inconsistent results	Insufficient
	C, 2	2006-2012	1,896	0/2/0	50	50	Moderate	Inconsistent	Imprecise	Direct	No conclusion, inconsistent results	Insufficient
School-Home-CHI	C,1	2011	589	0/0/1	0	0	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/ Moderate/ High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE
Home	D, 1	2004	59	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C, 3	2001-2012	262	0/2/1	0	33	Moderate	Inconsistent	Imprecise	Direct	No benefit	Low
Home-School--Community	C, 1	2009	1323	0/0/1	0	0	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home-PC-CHI	C, 1	2006	878	1/0/0	0	Unable to determine – actual outcome values not reported only significance	Low	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Primary Care	C, 1	2009	600	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Child care	P, 1	2007	268	0/0/1	100	100	High	NA	Precise	Direct	No benefit	Insufficient
	C, 3	2009-2012	2393	1/2/0	33	33	Moderate	Inconsistent	Imprecise	Direct	Not enough evidence to reach conclusion	Low
Community only	PA, 1	2010	46	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Community-School	C, 3	1997-2010	2966 and 24 schools (mean enrollment 1109)	0/3/0	66	66	Moderate	Consistent	Imprecise	Direct	Benefit	Moderat
Community-School-Home	C, 1	2007-2008	1326	0/1/0	100	100	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Community-Home	C, 2	2010	564	0/1/1	0	0	Moderate	Consistent	Imprecise	Direct	No conclusion, high risk of bias studies	Insufficient
Community-Home-PC-CC	C, 1	2010	43,811	0/1/0	100	100	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Community-School-PC-CC	D, 1	2010	NR	0/0/1	100	100	High	Inconsistent	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

\* One study in the school only section reported on the three interventions under review in this report and was accounted for in each grade.  
C = Combination of diet and physical activity; CHI = Consumer Health Informatics; D = Diet intervention; Intv = Intervention; N = Sample Size; NA = Not Applicable; P = Physical activity intervention; PC = Primary Care; Sig = Significant; SOE = Strength of Evidence.

**Strength of Evidence Table 2. Change in dietary intake.\***

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
School only	D, 1	1995	869	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C, 5	1999-2012	3197	0/3/2	20	100	Moderate	Consistent	Imprecise	Direct	Benefit	Low
School-Home	C, 9	1991-2012	10,515	0/9/0	11	78	Moderate	Consistent	Imprecise	Direct	Benefit	Low
School-Home-Community	C, 1	2012	148	0/0/1	0	100	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home	D, 1	2004	59	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C, 1	2012	146	0/1/0	0	100	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home-PC-CHI	C, 1	2006	878	1/0/0	0	100 (boys only)	Low	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Primary Care	C, 1	2009	600	0/1/0	0	Unable to determine (no baseline values provided; single arm study)	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Child care	C,2	2006-2012	916	1/1/0	0	0	Low	Inconsistent	Imprecise	Direct	Not enough evidenc to determine benefit	Low
Community-Home	C, 1	2010	261	0/0/1	0	1	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Community-School	C, 1	1997-2010	2966 and 24 schools (mean enrollment 1109)	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Community-Home-Primary	C, 1	2010	1789	0/1/0	1	1	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/ Moderate/ High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
Care- Childcare												

\* Not all settings and interventions reported intermediate outcomes. If no intermediate outcome was reported the setting and intervention row does not appear in this table.  
C = Combination of diet and physical activity; CHI = Consumer Health Informatics; D = Diet intervention; Intv = Intervention; N = Sample Size; NA = Not Applicable; P = Physical activity intervention; PC = Primary Care; Sig = Significant; SOE = Strength of Evidence.



Strength of Evidence Table 3. Fatty food intake. \*

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
School only	D, 1	1995	869	0/1/0	50	50	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient.
	C, 5*	1989-2011	2075	1/4/0	0	100	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate
School-Home	P, 1	1999	192	0/1/0	0	100	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C, 2	2012	2514	0/2/0	50	100	Moderate	Consistent	Imprecise	Direct	Benefit	Low
School-home-community	C, 3	2009-2012	1,244	0/2/1	67	100	Moderate	Consistent	Imprecise	Direct	Benefit	Low
Child care	C, 1	2006	401	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

\* Not all settings and interventions reported intermediate outcomes. If no intermediate outcome was reported the setting and intervention row does not appear in this table.  
C = Combination of diet and physical activity; CHI = Consumer Health Informatics; D = Diet intervention; Intv = Intervention; N = Sample Size; NA = Not Applicable; P = Physical activity intervention; PC = Primary Care; Sig = Significant; SOE = Strength of Evidence.

**Strength of Evidence Table 4. Change in fruit and vegetable intake. \***

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be statistically sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
School only	C, 11	1999-2012	7133	0/10/1	36	72	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate
School-Home	C, 7	2008-2012	6478	0/7/0	14	71	Moderate	Consistent	Imprecise	Direct	Benefit	Low.
School-Community	C, 1	2012	800	0/1/0	0	100	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
School-Home-Community	C, 5	2008-2012	7,896	1/2/2	20	80	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate
School-CHI	C, 2		1826	0/2/0	0	100	Moderate	Consistent	Imprecise	Direct	Benefit	Low
Home	C, 3	2001-2012	481	0/2/1	33	100	Moderate	Consistent	Imprecise	Direct	Benefit	Low
Home-School-Community	C, 1	2009	1323	0/0/1	100	100	High	NA	Precise	Direct	Not enough evidence to reach conclusion	Insufficient
Home-PC-CHI	C, 1	2006	878	1/0/0	0	100 (girls only)	Low	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Child care	C, 1	2009	1340	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

\* Not all settings and interventions reported intermediate outcomes. If no intermediate outcome was reported the setting and intervention row does not appear in this table.

C = Combination of diet and physical activity; CHI = Consumer Health Informatics; D = Diet intervention; Intv = Intervention; N = Sample Size; NA = Not Applicable; P = Physical activity intervention; PC = Primary Care; Sig = Significant; SOE = Strength of Evidence.

Strength of Evidence Table 5 Change in sugar sweetened beverage intake. \*

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
School only	C, 10	2001-2012	7133	0/7/1	0	100	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate
School-Home	C, 4	2010-2012	2523	0/3/1	25	100	Moderate	Consistent	Imprecise	Direct	Benefit	Low
School-Community	C, 1	2011	1,589	0/0/1	0	100	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
School-Home-Community	C, 5	2008-2012	7,896	0/2/1	67	100	Moderate	Consistent	Imprecise	Direct	Benefit	Low
School-CHI	C, 1		813	0/1/0	0	0	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home	C, 1	2011	90 households	0/0/1	0	0	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Community-School	D and P	2009	1108	0/1/0	0	1	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

\* Not all settings and interventions reported intermediate outcomes. If no intermediate outcome was reported the setting and intervention row does not appear in this table.  
C = Combination of diet and physical activity; CHI = Consumer Health Informatics; D = Diet intervention; Intv = Intervention; N = Sample Size; NA = Not Applicable; P = Physical activity intervention; PC = Primary Care; Sig = Significant; SOE = Strength of Evidence.

**Strength of Evidence Table 6. Physical activity. \***

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/ Moderate/ High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
School only	P, 3	2008-2009	503	0/3/0	100	100	Moderate	Consistent	Precise	Direct	Benefit	Moderate
	C, 13	1999-2011	5514	0/12/0	31	77	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate.
School-Home	P, 3	1999-2010	1648	1/2/0	67	67	Moderate	Inconsistent	Imprecise	Direct	Benefit	Moderate
	C, 16	1998-2012	17,575	2/12/2	50	94	Moderate	Consistent	Imprecise	Direct	Benefit	Moderate
School-Community	P, 1	2008	1,721	0/0/1	0	100	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C, 2	2011-2012	2,389	0/1/1	0	50	Moderate	Inconsistent	Imprecise	Direct	No benefit	Low
School-Home-Community	C, 7	2008-2012	11,265	1/4/2	29	57	Moderate	Inconsistent	Imprecise	Direct	No benefit	Low
School-CHI	P, 1	813		0/2/0	0	0	Moderate	Inconsistent	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C,2	1826		0/2/0	0	50	Moderate	Inconsistent	Imprecise	Direct	No Benefit	Low
School-Home/CHI	C, 1		589	0/0/1	100	100	High	NA	Precise	Direct	Not enough evidence to reach conclusion	Insufficient
Home	D, 1	2004	59	0/1/0	0	100	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C, 2	2011-2012	236	0/1/1	0	50	Moderate	Inconsistent	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home-School-Community	C, 1	2009	1323	0/0/1	0	100	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home-PC-CHI	C, 1	2006	878	1/0/0	0	100 (boys only)	Low	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
Primary Care	C, 1	2009	600	0/1/0	0	Unable to determine (no baseline values provided; single arm study)	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

\* Not all settings and interventions reported intermediate outcomes. If no intermediate outcome was reported the setting and intervention row does not appear in this table.  
C = Combination of diet and physical activity; CHI = Consumer Health Informatics; D = Diet intervention; Intv = Intervention; N = Sample Size; NA = Not Applicable; P = Physical activity intervention; PC = Primary Care; Sig = Significant; SOE = Strength of Evidence.

**Strength of Evidence Table 7 Change in sedentary behavior. \***

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
School only	P, 1	2008	233	0/1/0	100	100	Moderate	NA	Precise	Direct	Not enough evidence to reach conclusion	Insufficient
	C, 8	1999-2011	3978	0/8/0	25	62	Moderate	Inconsistent	Imprecise	Direct	No benefit	Low
School-Home	P, 2	1999-2008	1146	0/2/0	100	100	Moderate	Consistent	Precise	Direct	Benefit	Moderate
	C, 7	1998-2012	6480	0/6/1	29	85	Moderate	Consistent	Imprecise	Direct	Benefit	Low
School-Community	P, 1	2008	1,721	0/0/1	0	100	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
	C, 2	2011-2012	2,389	0/1/1	0	100	Moderate	NA	Imprecise	Direct	Benefit	Low
School-Home-Community	C, 3	2008-2012	7,102	1/1/1	0	33	Moderate	Inconsistent	Imprecise	Direct	No benefit	Low.
School-CHI	C, 2		813	0/2/0	0	100	Moderate	Consistent	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home	C, 2	2011-2012	236	0/1/1	0	0	Moderate	Consistent	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home-School-Community	C, 1	2009	1323	0/0/1	0	100	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Home-PC-CHI	C, 1	2006	878	1/0/0	100	100	Low	NA	Precise	Direct	Benefit	Low
Primary Care	C, 1	2009	600	0/1/0	0	Unable to determine (no baseline values provided; single arm study)	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

Setting, N	Intv, N	Years of studies	Enrolled Participants	Studies with Low/Moderate/High Risk of Bias(N)	% with favorable (statistically sig) outcome	% with favorable outcome (does not need to be stat sig)	Risk of Bias	Consistency	Precision	Directness	Conclusion	SOE/ Evidence Statement
Community-School	C, 1	2009	1108	0/1/0	0	1	Moderate	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient
Community-Home	C, 1	2010	261	0/0/1	0	1	High	NA	Imprecise	Direct	Not enough evidence to reach conclusion	Insufficient

\* Not all settings and interventions reported intermediate outcomes. If no intermediate outcome was reported the setting and intervention row does not appear in this table.

C = Combination of diet and physical activity; CHI = Consumer Health Informatics; D = Diet intervention; Intv = Intervention; N = Sample Size; NA = Not Applicable; P = Physical activity intervention; PC = Primary Care; Sig = Significant; SOE = Strength of Evidence.