

# Childhood Obesity Prevention Programs: Comparative Effectiveness

## Research Focus for Clinicians

**Purpose of the systematic review.** In response to a request from the public, the Johns Hopkins University Evidence-based Practice Center, funded by the Agency for Healthcare Research and Quality (AHRQ), performed a literature review to evaluate the evidence regarding the effectiveness of obesity prevention programs for children and adolescents conducted in schools, homes, primary care clinics, childcare centers, the community, or in a combination of these settings. The effectiveness of consumer health informatics-based interventions was also evaluated.

**Overview of the systematic review.** Only studies conducted in the United States or other high-income countries were included. Studies were eligible if they tested diet and/or physical activity interventions in children over a period of at least 1 year, with the exception of studies conducted in school-based settings, which were required to be up to 6 months long. The effects of the interventions were assessed on primary outcomes related to body composition including body mass index [BMI], weight, waist circumference, and prevalence of obesity or overweight. The effects of the interventions on clinical outcomes related to obesity (including blood pressure and blood lipids), intermediate behavioral outcomes related to energy balance (including dietary intake, physical activity, and sedentary behaviors), and adverse effects of interventions were also assessed. The systematic review evaluated 131 reports of eligible studies from all the literature in PubMed®, EMBASE®, PsycINFO®, CINAHL®, and the Cochrane Library through August 2012. Articles in the PubMed database dated back to 1966. An online version of this summary provides links directly to the sections of the full report with references for individual findings, inclusion criteria for the studies, and an explanation of the methods for rating the studies and determining the strength of evidence for individual findings. The online version of this summary and the full report are available at [www.effectivehealthcare.ahrq.gov/child-obesity-prevention.cfm](http://www.effectivehealthcare.ahrq.gov/child-obesity-prevention.cfm).

**Introduction to this summary.** This summary is provided to inform discussions with patients and/or caregivers of options and to assist in decisionmaking along with consideration of a patient's values and preferences. However, reviews about evidence should not be construed to represent clinical recommendations or guidelines.

## Background

Childhood overweight and obesity are highly prevalent in the United States, affecting one-third of children and adolescents. Since 1980, rates of obesity doubled for children aged 2 to 5 years and tripled for children aged 6 to 11 years and adolescents aged 12 to 19 years. The risk of obesity is also higher among minority and underserved populations.

Overweight children and adolescents are at greater risk for health problems when compared with their normal-weight peers and are more likely to become obese adults. Obese children and adolescents are more likely to have serious illnesses such as type 2 diabetes, hypertension, high cholesterol, obstructive sleep apnea, stroke, heart disease, nonalcoholic fatty liver disease, certain types of cancer, and bone and joint problems. Other reported health consequences of childhood obesity include eating disorders (such as bulimia nervosa, restrictive eating, bingeing, purging, generalized food preoccupation, and distorted body image) and mental health issues such as depression and low self-esteem.

A growing body of research suggests that many factors—including genetic and individual factors, home influences (parents, family, and friends), the school environment, factors in the local community (e.g., the presence of sidewalks, parks, safety from traffic, neighborhood disorder or violence), and policies implemented at the local, regional, and national levels—interact to contribute to obesogenic environments and affect children's weight.

A number of leading health organizations and expert panels, including panels from the World Health Organization and an Institute of Medicine expert panel, have recommended comprehensive interventions to fight the growing obesity epidemic. The main goal of most childhood obesity prevention programs is to help children who are not overweight from becoming overweight or obese. Programs designed for obesity prevention may also help overweight or obese children lose or stabilize their weight.

The authors of this review aimed to compare the effectiveness of obesity prevention programs conducted in the school, home, primary care clinic, childcare center, or community setting or in a combination of these settings. The authors of this review also assessed consumer health informatics interventions. Definitions of the types of interventions evaluated in the various settings are provided in Table 1.

## Conclusions

School-based programs involving dietary or physical activity interventions are effective in preventing childhood obesity. Combining a home or community component with a school-based program also works. The magnitude of effects appear to be modest, although the heterogeneity in study

interventions, outcomes, and duration make it difficult to estimate precise effect size. Evidence is limited about the effectiveness of interventions in other settings including those in primary care. This does not mean that such interventions do not work but that more research is needed.

## Clinical Bottom Line\*

The interventions discussed in this section are defined in Table 1 on the next page.

<p><b>Evidence for School-Based Interventions</b></p>	<p><b>Evidence for Home-Based Interventions</b></p>
<p><b>School-Based Interventions Only</b></p> <ul style="list-style-type: none"> <li>■ School-based diet or physical activity interventions prevent obesity or overweight in children. ●●○</li> <li>■ School-based combined diet and physical activity interventions prevent obesity or overweight in children. ○○○</li> </ul>	<p><b>Home-Based Interventions Only</b></p> <ul style="list-style-type: none"> <li>■ Home-based combination (physical activity and diet) interventions prevent overweight and obesity in children. ●○○</li> </ul>
<p><b>School-Based Interventions With a Home Component</b></p> <ul style="list-style-type: none"> <li>■ Physical activity interventions within school-based settings with a home component prevent obesity or overweight in children. ●●●</li> <li>■ Combined diet and physical activity interventions in a school-based setting with a home component prevent obesity or overweight in children. A meta-analysis based on 7 out of 17 studies that measured BMI showed that the overall weighted mean difference in BMI was <math>-0.17 \text{ kg/m}^2</math> (95-percent confidence interval <math>-0.57</math> to <math>0.23</math>; <math>p = 0.407</math>), which favored the intervention but was not statistically significant. ●●○</li> </ul>	<p><b>Evidence for Primary Care-Based Interventions</b></p> <ul style="list-style-type: none"> <li>■ Evidence is insufficient to determine if combined diet and physical activity interventions in a primary care setting prevent obesity or overweight in children (○○○). This does not mean that interventions do not work in this setting but that more research is needed.</li> </ul>
<p><b>School-Based Interventions With a Community Component</b></p> <ul style="list-style-type: none"> <li>■ Combined diet and physical activity interventions in a school-based setting with a community component prevent obesity or overweight in children. ●●○</li> </ul>	<p><b>Evidence for Childcare Center-Based Interventions</b></p>
<p><b>School-Based Interventions With a Home and Community Component</b></p> <ul style="list-style-type: none"> <li>■ Combined diet and physical activity interventions in a school-home-community setting prevent childhood obesity or overweight. ●●●</li> </ul>	<p><b>Childcare Center-Based Interventions Only</b></p> <ul style="list-style-type: none"> <li>■ Limited evidence from three poor-quality trials suggests that combined diet and physical activity interventions in a childcare center setting may have no beneficial effect on obesity or overweight prevention in children. ●○○</li> </ul>
<p><b>School-Based Interventions With Consumer Health Informatics Components</b></p> <ul style="list-style-type: none"> <li>■ Evidence is insufficient to determine if physical activity interventions or combined diet and physical activity interventions in a school setting with home and consumer health informatics components or with a consumer health informatics component alone prevent childhood obesity or overweight. ○○○</li> </ul>	<p><b>Evidence for Community-Based Interventions</b></p> <p><b>Community-Based Interventions With a School Component</b></p> <ul style="list-style-type: none"> <li>■ Combined diet and physical activity interventions in a community setting with some school involvement prevent childhood obesity or overweight. ●●○</li> </ul>
	<p><b>* Strength of Evidence Scale</b></p> <p>High: ●●● High confidence that the evidence reflects the true effect. Further research is very unlikely to change our confidence in the estimate of effect.</p> <p>Moderate: ●●○ Moderate confidence that the evidence reflects the true effect. Further research may change our confidence in the estimate of effect and may change the estimate.</p> <p>Low: ●○○ Low confidence that the evidence reflects the true effect. Further research is likely to change our confidence in the estimate of effect and is likely to change the estimate.</p> <p>Insufficient: ○○○ Evidence is either unavailable or does not permit a conclusion.</p>

**Table 1. Types of Obesity Prevention Interventions Assessed in This Review**

Interventions were classified by the primary setting where they took place. Several interventions included components that were conducted in settings other than the primary setting.

Type of Intervention	Description
<b>School-Based Interventions</b>	These took place primarily in schools (e.g., a change in the quantity and nutritional quality of food served at school, an increase in physical activity at school, promotion of walk-to-school days), although they might also have involved community (e.g., improving a community park, performing community service) or at-home activities (e.g., daily physical activity homework of about 10 minutes, preparing a healthy breakfast at home).
<b>Home-Based Interventions</b>	These took place in the child's home and targeted changes in the home (e.g., interventions to alter the foods purchased for home use, family fitness).
<b>Primary Care-Based Interventions</b>	These took place in the offices of a primary care practitioner, a clinic, or other health care entity delivering primary health care to children. They included advice to parents and/or caregivers to make changes at home (e.g., encouraging more than five daily servings of fruits and vegetables, limiting screen time [video games, television] to less than 2 hours per day, promoting greater than 1 hour of physical activity per day).
<b>Childcare Center-Based Interventions</b>	These took place in settings where children received nonparental/noncustodial care, generally outside the home (e.g., offering fruits and vegetables throughout the day, enhancing physical activity, designing exercise programs that improve pleasure of movement).
<b>Community-Based and Environment-Level Interventions</b>	These were delivered by enforcing policies or legislation (e.g., regulations on food retailing and distribution) or by changes to the built environment (e.g., sidewalks, parks, restaurants, farmers' markets, recreation facilities). Additionally, these interventions involved interaction with the community (a group of individuals that existed before the intervention and that shared one or more common characteristics, such as the YMCA or church groups).
<b>Consumer Health Informatics-Based Interventions</b>	Consumer health informatics 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.

### Gaps in Knowledge on Childhood Obesity Prevention

Several gaps in knowledge were identified in the evidence base reviewed for this report, which included:

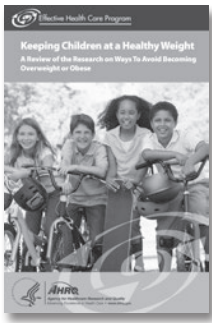
- A lack of sufficient information on the effectiveness of the following types of obesity and overweight prevention interventions
  - Interventions tested in the primary care or childcare settings
  - Environment-based and policy-based interventions (e.g., agriculture policies and regulations on food retailing and distribution)
  - Consumer health informatics interventions
- The need for greater understanding of the contexts and challenges associated with implementing prevention programs in different settings
  - Such an understanding would allow decisionmakers to have a better idea of the applicability of a specific intervention program to their own community.
- A paucity of information on the effects of various interventions in preventing childhood obesity in populations stratified by sex, age, race/ethnicity, demographics, or socioeconomic status
- Limited information on the effectiveness of obesity prevention programs in adolescents
  - Obesity in adolescents has been found to be more predictive of obesity during adulthood than is obesity in younger children.

### What To Discuss With the Parents of Your Patients and/or Caregivers of Your Patients

- That clinicians are concerned about childhood obesity and the welfare of their patients
- The patient's BMI and how to diagnose overweight/obesity in children
- The possible factors contributing to overweight and obesity in children, including less physical activity, more sedentary/screen time, increased empty and liquid calories in the diet, and inappropriate use of food rewards or eating when not hungry
- What constitutes an appropriate serving size
- The importance of monitoring total daily caloric intake as opposed to total daily food intake
- Important things that can be done at home to keep children at a healthy weight
- The potential health consequences of overweight and obesity in children
- The relative effectiveness of the various interventions in preventing overweight and obesity
- The programs and resources that help children maintain a healthy weight that are available at school or in the community
  - If a list of such resources could not be obtained, encourage parents and caregivers to explore schools, school district offices, and community centers for the available resources.
- What can be done if healthy food or safe locations for physical activity are not easily accessible to patients and their families

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## Resource for Patients



*Keeping Children at a Healthy Weight, A Review of the Research on Ways To Avoid Becoming Overweight or Obese* is a free companion to this clinician research summary. It can help the parents and caregivers of children talk with their health care professionals about the various programs for preventing childhood obesity that are available.

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## Ordering Information

For electronic copies of *Keeping Children at a Healthy Weight, A Review of the Research on Ways To Avoid Becoming Overweight or Obese*, this clinician research summary, and the full systematic review, visit [www.effectivehealthcare.ahrq.gov/child-obesity-prevention.cfm](http://www.effectivehealthcare.ahrq.gov/child-obesity-prevention.cfm). To order free print copies, call the AHRQ Publications Clearinghouse at 800-358-9295.

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## Source

The information in this summary is based on *Childhood Obesity Prevention Programs: Comparative Effectiveness Review and Meta-Analysis*, Comparative Effectiveness Review No. 115, prepared by the Johns Hopkins University Evidence-based Practice Center under Contract No. 290-2007-10061-I for the Agency for Healthcare Research and Quality, June 2013. Available at [www.effectivehealthcare.ahrq.gov/child-obesity-prevention.cfm](http://www.effectivehealthcare.ahrq.gov/child-obesity-prevention.cfm). This summary was prepared by the John M. Eisenberg Center for Clinical Decisions and Communications Science at Baylor College of Medicine, Houston, TX.