

Promoting Good Nutrition and Physical Activity in Child-Care Settings

Healthy Eating Research

Building evidence to prevent childhood obesity

A Research Brief, May 2007

Child-care facilities provide a valuable opportunity to promote healthy eating and physical activity behaviors in children. The alarming rates of obesity among children in the United States make the opportunity to introduce healthy behaviors during early childhood especially important. Between 1971 and 2004, the rate of obesity among children ages 6 to 11 years increased nearly fivefold (from 4 percent to 19 percent), and the rate among preschool children ages 2 to 5 years nearly tripled (from 5 percent to 14 percent).^{1,2} Today, one-third of all children and adolescents in the U.S. are either obese or at risk for becoming obese.²

There are serious health and economic consequences associated with obesity. Children who are obese or at risk for obesity have a greater likelihood of being obese in adulthood and developing heart disease, diabetes and other serious health conditions.³ In addition to the extraordinary toll on our nation's health, obesity also poses a tremendous financial burden, with costs estimated at \$117 billion annually.³

Poor diet and physical inactivity are major contributors to obesity, and the early childhood years are an important period for developing healthy food preferences and motor skills.^{4,5}

According to current data, only about one-quarter of children ages 2 to 11 years consume three daily servings of vegetables, and less than one-half of those children consume two daily servings of fruit.⁶ In addition, very few U.S. children achieve recommended levels of physical activity.⁷

The proportion of working mothers with young children increased from 39 percent in 1975 to 63 percent in 2003.⁸ As a result, child-care use is also on the rise. The majority (60 percent) of infants and children up to age 5 spend an average of 29 hours per week in some form of child-care setting.⁹ Although older children spend a substantial amount of time in school, more than half of young people ages 5 to 14 years also spend time in a regular child-care setting.¹⁰

Given the widespread and increasing use of child care, it is important to understand the potential for child-care settings to have an influence on the development of obesity among children. The purpose of this brief is to present an overview of research that has examined the nutritional quality of meals and snacks, opportunities for physical activity and the outcomes of interventions designed to prevent obesity in child-care settings.



What child-care arrangements and programs are used by children in the U.S.?

Child-care arrangements in the U.S. may be classified broadly as relative care, home-based non-relative care and center-based care.⁹ Care provided by a babysitter, neighbor, friend or other non-relative may be provided in a child's home or the provider's home. Non-relative providers who care for two or more children are classified as family child-care providers. Center-based care includes child-care centers, nursery schools, preschools and Head Start programs. Use of multiple care arrangements is not uncommon. The distribution of arrangements for children from birth to age 5 is as follows:

- 35 percent receive relative care;
- 22 percent receive home-based, non-relative care; and
- 60 percent receive center-based care.⁹

School-aged children also may spend time in community-based enrichment activities (e.g., sports, lessons, clubs and after-school programs).



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What types of federal support exist for child-care programs?

Family child-care homes and center-based care programs that are licensed or approved to provide services may be eligible to receive federal support for the meals and snacks they serve to children ages 12 years and under.¹¹ The Child and Adult Care Food Program (CACFP), jointly administered by the U.S. Department of Agriculture and designated state agencies, provides meals and snacks for nearly 2.1 million children in center-based care and almost 900,000 children in family child-care homes.¹² CACFP regulations and provisions are summarized below.

- Eligible programs include nonprofit child-care centers, for-profit child-care centers that serve 25 percent or more low-income children, after-school care programs, Head Start programs and other institutions that are licensed or approved to provide child-care services.¹¹ As family child-care businesses tend to be small, participation is limited to businesses that have a sponsoring organization. Sponsors serve as intermediaries between businesses and the designated state administrative agency and ensure that centers comply with federal and state CACFP regulations.
- For each child enrolled in an eligible program, the CACFP provides funding reimbursement to child-care centers and family child-care providers for up to either two meals and one snack or one meal and two snacks daily.¹¹ After-school programs can receive reimbursement for one snack if at least half of the children are eligible for free or reduced-price meals based on school data. Meals and snacks served to children in child-care centers, Head Start and after-school programs are reimbursed at rates based on the type of meal served (i.e., breakfast, lunch or supper) and a child's eligibility for free, reduced-price or paid meals and snacks. Commodities or cash in lieu of commodities are also available to centers in most states. Meals and snacks served to children in family child-care homes are reimbursed based on eligibility. There are higher "tier I" reimbursement rates for child-care homes located in low-income areas and for low-income providers and children.

- To be eligible for reimbursement, CACFP guidelines require that meals and snacks include a minimum number of age-appropriate servings from four food categories: fluid milk; vegetables, fruit or 100 percent juice; grains or bread; and meat or meat alternates (Table 1).¹¹ However, CACFP guidelines do not require meals and snacks to meet any nutrient-based standards and do not prohibit child care providers from offering additional non-reimbursable foods or beverages low in nutrition and high in calories. There are no funding provisions or legislative requirements for nutrition education.¹³

Table 1. Child and Adult Care Food Program Meal Pattern Requirements for Children, Ages 1 through 12 Years*

Food components*	Breakfast (include 3 components)	Lunch or Supper (include all 4 components)	Snack (select 2 of the 4 components)
Milk	1	1	1
Vegetable/fruit/100% juice	1	2	1
Grains/bread	1	1	1
Meat/meat alternate		1	1

* Table reflects the required number of servings from these food component categories for the particular meal or snack being served. The required serving size varies according to the age of the child and the meal or snack being served. Required serving sizes can be found at http://www.fns.usda.gov/cnd/Care/ProgramBasics/Meals/Meal_Patterns.htm.

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Head Start and Early Head Start are federal child development programs serving low-income children ages 3 to 5 years and low-income children from birth to age 2, respectively.¹⁴ In 2005 more than 900,000 children were served by 19,000 centers across the U.S.¹⁵ The overall goal of both programs is to increase the school readiness of young children in low-income families.¹⁴ To achieve this goal, a comprehensive range of services are provided to young children, including educational, medical, dental, mental health and nutrition services.

A number of federal regulations specifically address the promotion of healthy eating and physical activity. These regulations ensure that: 1) parents receive guidance on nutrition and physical activity; 2) facilities participate in the CACFP; 3) meals and snacks provide one-third to one-half of the daily nutritional needs of children in part-day and full-day programs; 4) staff model healthy eating behaviors and attitudes for children; and 5) facilities provide opportunities for outdoor and indoor active play. However, there are no federal regulations relating to the amount, frequency or type of physical activities to be provided for children.¹⁶

What regulations govern nutrition and physical activity in child-care settings?

Although several professional organizations have developed and published recommendations for nutrition and physical activity in child-care settings (Table 2),^{17, 18} outside of Head Start, there are no federal regulations governing child-care facilities. Each state sets and enforces its own regulations that providers are required to follow in order to operate legally. Regulations regarding nutrition and physical activity vary widely across the states. Within states, regulations also may differ for various types of child-care settings. Child-care centers are often the most heavily regulated, while small family child-care homes are usually the least regulated. Few states have comprehensive regulations for nutrition or physical activity.^{19, 20}

- Only two states require that meals and snacks follow the *Dietary Guidelines for Americans*, and only 15 states specify the percentage of children’s daily nutritional requirements to be provided per meal or per a given number of hours in care.
- The amount of time children should be engaged in physical activity is specified in the regulations of just two states, and only one state applies the regulation to all types of child-care settings.
- Only nine states have set a quantitative limit on the amount of time children may spend watching television/videos or playing video/computer games.

What is known from research about the nutritional quality of foods and beverages offered and the promotion of healthy eating in child-care settings?

Research conducted to examine the nutritional quality of foods and beverages served in child-care settings has been extremely limited in scope. Little is known about the nutrient composition of meals and snacks or the types of foods and beverages provided in child-care settings. In particular, as most research has focused on CACFP providers, very little is known about what foods and beverages are served in facilities that do not participate in this program.

Nutritional standards used to evaluate the foods and beverages offered in child-care settings have included the CACFP meal pattern requirements, the *Dietary Guidelines for Americans*, and the nutrient-based recommendations for child-care providers developed by the American Dietetic Association (ADA).^{11, 17, 21} The ADA recommends that food offered to children in care for four to seven hours per day provide at least one-third of their daily needs (i.e., Recommended Dietary Allowances or RDAs) for energy and nutrients, and that food offered to children in care for eight hours or more meet at least one-half to two-thirds of their daily needs.¹⁷ Findings from the few studies that have been conducted indicate meals and snacks in child-care settings may often be of poor nutritional quality.^{22–24}

Table 2. American Dietetic Association Benchmarks for Nutrition Programs in Child-Care Settings

<ul style="list-style-type: none"> ■ Menus should be nutritionally adequate and consistent with the <i>Dietary Guidelines for Americans</i>. ■ Foods should be provided in quantities and meal patterns that balance energy and nutrients with children’s ages, appetites, activity levels, special needs and cultural or ethnic differences in food habits. ■ Parents should be involved in the nutrition component of their child-care facility. ■ Plenty of fresh or frozen fruits and vegetables and whole-grain products should be offered to children. ■ The addition of fat, sugar and sources of sodium should be minimized. ■ Food preparation and service should be consistent with best practices for food safety and sanitation. 	<ul style="list-style-type: none"> ■ Furniture and eating utensils should be age-appropriate and developmentally suitable to encourage children to accept and enjoy mealtime. ■ Child-care personnel should encourage positive experiences with food and eating. ■ Caregivers should receive appropriate training in nutrition and food service. ■ Child-care programs should obtain consultation and technical assistance from a dietetics professional on a regularly scheduled basis. ■ Nutrition education for children and for their parents should be a component of the child-care program. ■ Child-care programs must comply with local and state regulations related to wholesomeness of food, food preparation facilities, food safety and sanitation.
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Only four nationally representative studies have evaluated the nutritional quality of food and beverage offerings in child-care settings.²³ The most recent study (1999) was not comprehensive, as its primary purpose was to evaluate the impact of legislation more narrowly targeting CACFP reimbursement benefits to low-income children, and only tier II family child-care providers were assessed.²⁴ This study found CACFP meal pattern requirements were met by the majority of those sampled, and the most common combinations of meals and snacks offered (breakfast, lunch and one snack or breakfast, lunch and two snacks) met ADA recommendations. Meals and snacks provided, on average, more than 100 percent of the RDA for protein, vitamin A and vitamin C and more than two-thirds of the RDA for food energy, calcium and iron. However, several nutritional concerns were identified, including the following:

- The most common combinations of meals and snacks provided an average of 13 percent of energy from saturated fat, exceeding the *Dietary Guideline* recommendation of less than 10 percent.
- Average sodium levels in common combinations of meals and snacks were high relative to the amount of food energy they provided.
- One-third of snacks and breakfast meals offered did not include any fruit or vegetable item.
- Less than half of morning or afternoon snacks included milk.

Smaller studies also have evaluated child-care menus and/or dietary records of young children and raised concerns about the nutritional quality of the foods and beverages provided. Together, they suggest that children who attend child care may not be offered the recommended share of certain key nutrients that are essential for healthy brain development, including iron, zinc and magnesium. It cannot be assumed that the foods and beverages children consume at home compensate for dietary shortfalls in meals provided during child care.

- In one study, the dietary intakes of 51 children (ages 3 to 6 years) in central Texas were recorded for three days by researchers during child care and by parents for meals and snacks consumed away from the child-care center.²² Foods consumed during child care generally supplied 50 percent to 67 percent of children's requirements for energy and nutrients, with the exceptions of niacin, iron and zinc. When dietary

intake away from child care also was considered, total daily intakes of nearly all children met age-appropriate recommendations for vitamins A and C, niacin, riboflavin, thiamin and calcium. However, more than 15 percent of children consumed inadequate amounts of energy, iron and zinc.

- Another study considered the foods and beverages offered to young children (ages 3 to 5 years) at lunch.²⁵ A week of lunch menus from more than 100 CACFP-participating centers in Virginia were reviewed, and the nutrient levels of lunches were compared with recommendations. The results indicated that, while vitamins A and C and calcium were adequately provided, 72 percent of menus averaged less than two-thirds of the recommendation for iron at lunch (one-third of the RDA).

A limited number of studies suggest that nutrition knowledge is lacking among child-care providers and many opportunities for promoting the development of healthy eating behaviors are being missed.^{26, 27} For example, observations of mealtime caregiver behaviors in 24 licensed child-care programs demonstrated that low percentages of caregivers display behaviors consistent with expert recommendations.²⁶

- On a knowledge survey addressing common nutrition problems of children and tools used to plan a healthful diet (e.g., CACFP guidelines and RDAs), the average score achieved by caregivers was only 11 of 20 points.
- While caregivers sat with children during mealtime in 69 percent of observations, caregivers did not eat the same foods as children nearly half of the time. Caregivers typically consumed no food or ate fast food instead of the meal being served.
- Only 50 percent of caregivers made comments about nutrition during meals, and only 59 percent of caregivers were observed encouraging children to taste all of the foods served.

What is known from research about opportunities for and the promotion of physical activity in child-care settings?

Very little research has been conducted to examine the physical activity or sedentary activity levels of children in child-care settings. (Sedentary activities include playing computer games, watching television, reading, etc.) The *Dietary Guidelines for Americans* recommend that children engage in at least 60 minutes of moderate-to-vigorous physical activity on most—preferably all—days of the week.²¹ Other expert groups further recommend that a 10-minute physical activity break be provided for every hour a child spends engaged in sedentary activities and that one or more special physical activities (such as a field trip) be provided each week.^{17, 28}

For young children (ages 1 to 5 years) in particular, the National Association for Sport and Physical Education recommends at least two hours of physical activity daily: half spent in structured activities and half spent in unstructured, free play.²⁹ Findings from the few studies conducted to date indicate that: 1) preschool children may not be meeting recommendations for physical activity; and 2) child-care policies and practices can greatly influence physical activity levels.

- For example, one study that used accelerometers to objectively measure physical activity levels of 247 preschoolers at nine child-care centers found that the average child participated in only 7.7 minutes of moderate-to-vigorous physical activity per hour of attendance.³⁰ Therefore, during an eight-hour day at child care, the average child engaged in slightly less than one hour of physical activity. Unless children went home and participated in another hour of physical activity, they fell far short of the recommendation for preschool children.²⁹
- In agreement with other research, this study also showed that the facility a child attended was a more important predictor of moderate-to-vigorous physical activity level than demographic characteristics.^{30, 31} Average physical activity levels of children varied from 4.4 to 10.2 minutes per hour across the nine child-care centers.³⁰
- At least one study has additionally examined characteristics of child-care centers that promote physical activity. Results of this study suggest that children who attend child-care centers offering more field trips, college-educated teachers, space for gross motor activities and playground equipment spend more time engaged in moderate-to-vigorous physical activity.³²

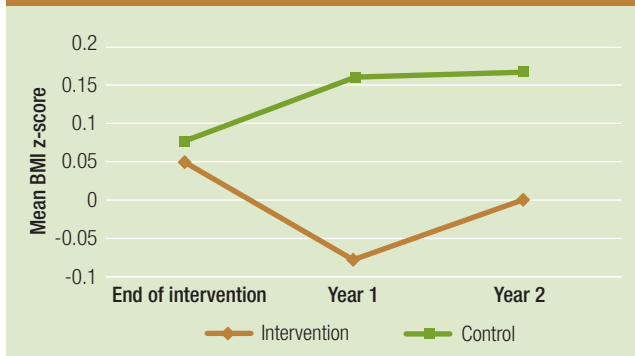
What types of interventions could be implemented in child-care settings to reduce obesity?

Few obesity-prevention efforts have been evaluated in child-care settings. However, published intervention research and observational studies indicate that the following may be effective strategies for preventing obesity: educating providers, parents and children; modifying child-care meals and snacks; reducing television viewing; and reducing consumption of sweetened beverages.

- An evaluation of the *Hip-Hop to Health Jr.* program demonstrated the value of educating preschool children and their parents about healthy eating and physical activity.^{33, 34} This randomized controlled study enrolled 12 Head Start centers serving minority children. Half of the centers received the intervention program, and half of the centers served as control sites. The intervention program involved the following:
 - Fourteen weeks (three 40-minute sessions per week) of physical activities and education on healthy eating for children; and
 - Weekly newsletters with homework assignments for their parents.

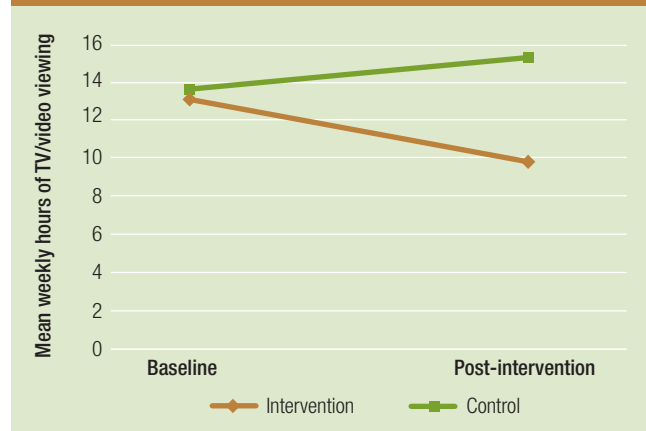
Children and parents enrolled at control centers received a similar, less intensive (one time weekly for 14 weeks) health education curriculum that focused on topics other than healthy eating and exercise. Researchers calculated children's body mass indices (BMIs) and BMI z-scores—or the number of standard deviations from the mean—immediately after the intervention ended, as well as one and two years later. BMI z-score is a measure of weight status that takes into account the age and gender of the children. Immediately after the intervention, weight status did not differ between intervention and control groups. At one-year and two-year follow-up assessments, a significant effect on weight status was found, but not on food intake or physical activity. Compared with children in the control group, those who received the intervention had smaller increases in BMI at both assessments (Figure

Figure 1: BMI z-scores for Hip-Hop to Health Jr. child participants at the end of the intervention, 1-year and 2-year follow-ups



- The *Healthy Start* project also enrolled Head Start centers serving predominantly low-income, minority preschool children. Although the *Healthy Start* cardiovascular risk reduction project was not designed with the aim of affecting weight status, the project demonstrated the feasibility of improving the nutritional quality of child-care meals.^{35, 36} Over two years, the fat and saturated fat in food service menus at intervention centers were reduced, and intakes of saturated fat from child-care meals were decreased without compromising preschoolers' intakes of energy or essential nutrients.
- Several studies indicate that excessive television viewing (more than two hours per day) contributes to greater rates of obesity in preschoolers and school-age children.³⁷⁻⁴² The feasibility and benefits of reducing television viewing have been demonstrated by intervention programs. For example, a randomized controlled trial in 16 child-care centers (eight intervention centers and eight control centers) serving mostly non-Hispanic white preschoolers demonstrated that seven educational sessions (each one hour in length) and take-home parent activities were effective at reducing excessive television viewing over one year despite having no significant impact on weight status (Figure 2).⁴³ At least two similar school-based intervention studies of greater intensity have been evaluated in older children (grades 3 to 7) and showed that measurable relative reductions in BMI were associated with limiting television viewing.^{44, 45}

Figure 2. Children's mean weekly hours of TV/video viewing before and after a 7-session intervention program



- Encouraging a reduction in sweetened beverage consumption also may be an effective strategy for preventing obesity in children. While no interventions designed to modify consumption habits in child-care settings have been carried out to date, at least two interventions in school-age children^{46, 47} have found that reducing sweetened beverages has a beneficial effect on BMI. In addition, several observational studies support an association between consumption habits and weight status.⁴⁸⁻⁵¹ Fruit juice can provide important nutrients, such as vitamin C, but is easily overconsumed by young children, and some research indicates it may contribute to consumption of excessive calories or poor nutrition.⁴⁸ The American Academy of Pediatrics recommends a limit of four to six ounces per day for children ages 1 to 6 years and two six-ounce servings per day for older children.⁵²

What research is needed to direct nutrition and physical activity improvements in child-care settings?

Four major goals have been identified for future research investigating nutrition and physical activity in child-care settings.¹⁹

- **To describe the food and physical activity environments in various child-care settings.**

Key characteristics of child-care environments that may influence dietary intake and physical activity behaviors include what food, beverages and play equipment are available; the amount of training staff have in nutrition and physical activity; and the eating and activity behaviors modeled by caregivers. Research is especially

needed to describe these environmental characteristics and to identify disparities that may adversely impact the health of children served by child-care providers in low-income neighborhoods.

- **To compare, in nationally representative samples, the meals and snacks served and consumed in child-care settings to national dietary recommendations, such as the *Dietary Guidelines for Americans* and the Dietary Reference Intakes.**

Research has not been conducted to evaluate the nutritional quality of meals and snacks for a nationally representative sample of CACFP-participating child-care sites in more than 10 years. The most recent national study, in 1999, evaluated only the nutritional quality of meals and snacks in tier II family child-care homes. Thus, there is a particular need for research evaluating the meals and snacks served and consumed in child-care facilities that are located in low-income areas or operated by a low-income provider. Because child-care menus may not accurately reflect what foods and beverages are served to or consumed by children, these studies should assess actual dietary intake.⁵³

- **To develop, implement and evaluate intervention programs focused on preventing obesity and promoting healthy eating and physical activity behaviors in child-care facilities.**

The implementation and evaluation of intervention programs in child-care facilities that primarily serve low-income neighborhoods should be a priority.

- **To identify effective strategies for engaging parents and promoting healthy eating and physical activity behaviors at home.**

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About Healthy Eating Research

Healthy Eating Research is a national program of the Robert Wood Johnson Foundation. Technical assistance and direction are provided by the University of Minnesota School of Public Health under the direction of Mary Story, Ph.D., R.D., program director, and Karen Kaphingst, M.P.H., deputy director. The Healthy Eating Research program supports research to identify, analyze and evaluate environmental and policy strategies that can promote healthy eating among children and prevent childhood obesity. Special emphasis is given to research projects that benefit children in low-income and racial-ethnic populations at highest risk for obesity.

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