

The Role of Child Care Settings in Obesity Prevention

Mary Story, Karen M. Kaphingst, and Simone French

Summary

Mary Story, Karen Kaphingst, and Simone French argue that researchers and policymakers focused on childhood obesity have paid insufficient attention to child care. Although child care settings can be a major force in shaping children's dietary intake, physical activity, and energy balance—and thus in combating the childhood obesity epidemic—researchers know relatively little about either the nutrition or the physical activity environment in the nation's child care facilities. What research exists suggests that the nutritional quality of meals and snacks may be poor and activity levels may be inadequate.

Few uniform standards apply to nutrition or physical activity offerings in the nation's child care centers. With the exception of the federal Head Start program, child care facilities are regulated by states, and state rules vary widely. The authors argue that weak state standards governing physical activity and nutrition represent a missed opportunity to combat obesity. A relatively simple measure, such as specifying how much time children in day care should spend being physically active, could help promote healthful habits among young children.

The authors note that several federal programs provide for the needs of low-income children in child care. The Child and Adult Care Food Program, administered by the Department of Agriculture, provides funds for meals and snacks for almost 3 million children in child care each day. Providers who receive funds must serve meals and snacks that meet certain minimal standards, but the authors argue for toughening those regulations so that meals and snacks meet specific nutrient-based standards. The authors cite Head Start, a federal preschool program serving some 900,000 low-income infants and children up to age five, as a model for other child care programs as it has federal performance standards for nutrition.

Although many child care settings fall short in their nutritional and physical activity offerings, they offer untapped opportunities for developing and evaluating effective obesity-prevention strategies to reach both children and their parents.

www.futureofchildren.org

Mary Story is a professor in the Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, and the director of the Robert Wood Johnson Foundation (RWJF) Healthy Eating Research Program. Karen M. Kaphingst is in the Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, and is the deputy director of the RWJF Healthy Eating Research Program. Simone French is a professor in the Division of Epidemiology and Community Health, School of Public Health, University of Minnesota.

The prevalence of overweight and obesity among American children has been increasing at an alarming rate. Among preschool children aged two to five, overweight has doubled over the past thirty years. Almost one in every four preschoolers is either overweight or at risk of overweight.¹ Prevalence rates are highest among African American, Hispanic, and Native American preschoolers.

Of the nation's 21 million preschool children, 13 million spend a substantial part of their day in child care facilities.² Although much has been written on the role of schools in obesity prevention, surprisingly little has been written on how child care settings can help combat childhood obesity. With so many preschool children in attendance, child care settings can be a major force in shaping children's dietary intake, physical activity, and energy balance.

Changing Trends in Maternal Employment

Reliance on child care has grown rapidly in the United States over the past three decades because of changes in demographics, family structure, gender roles, and families' needs for economic security. Traditionally, the number of women in the workforce has driven the demand for child care.³ From 1970 to 2000, the share of mothers in the labor force (either employed or looking for work) rose from 38 percent to 68 percent; for mothers of children up to age three the rate rose from 24 percent to 57 percent.⁴ Today 60 percent of mothers with preschool-aged children are employed, with 70 percent working full-time and 30 percent part-time. Of women with children aged six to seventeen, 75 percent are employed; 78 percent work full-time and 22 percent, part-time.⁵ Mandatory work re-

quirements under the 1996 welfare reform law increased the number of low-income parents who work and the number of their children who receive child care.⁶

Child Care Settings

Child care participation in the United States is at an all-time high. Child care, in fact, is now the norm. Parents and child care providers are sharing responsibility for a large and growing number of children during important developmental years, making child care an important setting in which to address the problem of obesity.

Child Care Supply and Participation

According to a study sponsored by the National Child Care Association, Americans paid approximately \$38 billion for licensed child care in 2001.⁷ Estimates indicate the number of child care facilities in the nation increased more than fourfold in the past thirty years—from 25,000 in 1977, to 40,000 in 1987, and to more than 116,000 in 2004.⁸ A precise count of child care settings is not possible for several reasons. First, facilities open and close rapidly. Next, because many family day care homes and some centers and preschools are legally exempt from licensing and registration requirements, they are therefore not on record in state child care licensing offices. Finally, the estimated number of child care facilities does not take into account care provided by nannies, babysitters, and relatives.⁹

Families choose among a variety of day care options: centers (for groups of children in a nonresidential setting, such as a business, church, or school); small family child care homes (typically for six or fewer children in the day care provider's home); large family, or group, child care homes (typically for seven to twelve children cared for by two providers in a

provider's home); in-home care (by a nonrelative, such as a nanny or au pair, in the family home); and kith and kin care (by a relative, neighbor, or friend of one family only).¹⁰

Child Care Patterns for Preschool Children

Preschool children enter care as early as six weeks of age and can be in care for as many as forty hours a week until they reach school age.¹¹ Forty-one percent of preschool children are in child care for thirty-five or more hours a week. Another 25 percent are in care for fifteen to thirty-four hours a week, while 16 percent are in care for one to fourteen hours. Eighteen percent spend no time in child care.¹²

Nationwide, nearly half of children younger than five with a working mother are cared for in child care centers (32 percent) and family child care homes (16 percent). About 24 percent are cared for by a parent, 23 percent by another relative and 6 percent by a nanny or babysitter. Approximately 80 percent of children aged five and younger with employed mothers are in a child care arrangement for an average of almost forty hours a week.¹³

Child care arrangements vary by race and ethnicity. The 2001 National Household Education Survey collected information about the types of child care arrangements used by families.¹⁴ Some children participate in more than one type of arrangement. Up through age six, Hispanic children are least likely to receive child care in a center-based setting (20 percent) and most likely to be cared for by parents only (53 percent). In addition, 23 percent receive in-home care by a relative, and 12 percent receive in-home care by a nonrelative. African American children are most likely to receive care in a center-based program (41 percent) and least likely to be

cared for in-home by a nonrelative (14 percent); 34 percent are cared for in-home by a relative, and 26 percent receive parental care only. For non-Hispanic white children, similar numbers receive parental care only (38 percent) and attend center-based programs (35 percent), with 20 percent receiving in-home care by a relative and 19 percent being cared for in-home by a nonrelative.

The percentage of children enrolled in formal child care arrangements also varies by state.¹⁵ For example, in Minnesota 55 percent of children under age five are cared for in child care centers or family day care homes, as against 35 percent in California. State differences may be due to demographic and labor patterns, child care subsidies, and costs and supply of child care.¹⁶

Child Care Patterns for Children Aged Six to Fourteen

A large share of school-aged children also participates in child care. Of the estimated 35 million U.S. children aged six to fourteen, 22 million (63 percent) have an employed mother. According to the U.S. Census Bureau's Survey of Income and Program Participation, the distribution of primary nonschool arrangements for these children was child care centers (5 percent); nonrelative care, including day care homes, babysitters, and nannies (9 percent); organized activities (12 percent); parental care (37 percent); grandparent care (14 percent); care by other relatives (12 percent); and self-care (12 percent). School-aged children spent a significant amount of time in these nonschool arrangements: 63 percent of children aged six to fourteen spent an average of twenty-one hours a week in the care of someone other than a parent before and after school. Children in center-based care average twenty-one hours a week in that setting; those in nonrelative care, such as

family child care homes, average nineteen hours a week.¹⁷

Racial and ethnic differences in child care participation by setting are less pronounced for school-aged children than for preschool children.¹⁸ Most school-aged children rely on parent, grandparent, or other relatives' care outside of school hours (61 percent of white

A high-quality diet for young children provides sufficient energy and nutrients to promote normal growth and development, to achieve and maintain a healthy weight, and to attain immediate and long-term health.

children, 67 percent of African American children, and 69 percent of Hispanic children).

Nutrition

Obesity prevention involves maintaining energy balance at a healthy weight while achieving overall health and meeting nutritional needs. Technically, energy balance means that energy intake is equivalent to energy expenditure, resulting in no net weight gain or weight loss. But children must be in a slightly positive energy balance to get the energy necessary for normal growth. In children, the goal is to promote growth and development and prevent *excess* weight gain. A primary obesity-prevention approach emphasizes efforts that can help normal-weight children maintain that weight and help overweight children prevent further excess weight gain.¹⁹

Nutrition Recommendations for Young Children

A high-quality diet for young children provides sufficient energy and nutrients to promote normal growth and development, to achieve and maintain a healthy weight, and to attain immediate and long-term health. The Institute of Medicine Dietary Reference Intakes provide specific daily nutrient needs of children.²⁰ *The Dietary Guidelines for Americans* provide science-based dietary advice to promote health and reduce the risk for obesity and other chronic diseases through diet and physical activity for Americans older than age two.²¹ The 2005 *Dietary Guidelines* make five key recommendations. At least half the grains consumed by children should be whole grains. Children aged two to eight should drink two cups a day of fat-free or low-fat milk or equivalent milk products. Children aged two and older should eat sufficient amounts of fruits and vegetables. Children aged two to three should limit their total fat intake to 30 to 35 percent of calories, and children aged four and older should consume between 25 to 35 percent of calories from fat, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids. Finally, children should get at least sixty minutes of physical activity on most, preferably all, days of the week.

Poor diet is a major contributor, along with physical inactivity, to the obesity epidemic. To reverse the trend toward obesity, children must have access to and consume such healthful foods as fruits and vegetables, consume adequate portion sizes, limit intake of fats and added sugars, and get plenty of physical activity. The diets of most U.S. children do not meet the *Dietary Guidelines*.²² They tend to be low in fruits and vegetables, calcium-rich foods, and fiber and to be high in total fats, saturated and trans fats, salt, and

added sugars. A recent study examined diet quality trends among a nationally representative sample of preschool children aged three to five between 1977 and 1998.²³ Although dietary quality improved slightly over those years, total energy intake increased, as did added sugars and excess juice consumption. Consumption of grains, fruits, and vegetables improved but was still well below recommended levels.

Diets of infants and toddlers are also of concern. In the Feeding Infants and Toddlers Study, a national random sample of 3,022 infants and toddlers from four to twenty-four months old, energy intakes were higher than recommended, according to dietary recall data, suggesting that many caregivers may be overfeeding their children.²⁴ Up to a third of children aged seven to twenty-four months ate no vegetables or fruits on the day of the dietary recall. For fifteen- to eighteen-month-olds, the vegetable most commonly eaten was french fries. More than 25 percent of nineteen- to twenty-four-month-olds ate french fries or fried potatoes on any day, and 44 percent consumed a sweetened beverage.²⁵ Although these studies did not distinguish between foods and beverages consumed at home and at child care, they point to troubling aspects of young children's diets.

The overall diets of children must be improved. Early attention to diet would have immediate nutritional benefits, would help prevent obesity, and could reduce chronic disease risk if healthful habits are carried into adulthood. Clearly, establishing healthful dietary and physical activity behaviors needs to begin in childhood. Child care settings can lay the foundations for health and create an environment to ensure that young children are offered healthful foods and regular physical activity.

Table 1. Federal Child and Adult Care Food Program, Fiscal Year 2004

<i>Child care homes</i>	
Average daily participation of children	913,071
Change in child participation in past ten years	-0.6%
Number of participating family child care homes	157,522
<i>Child care centers (includes Head Start)</i>	
Average daily participation of children	1,969,129
Change in child participation in past ten years	62.4%
Number of participating child care centers	44,323
Total federal funding	\$1,918,190,945

Sources: Food Research and Action Center, "State of the States, 2005: A Profile of Food and Nutrition Programs across the Nation" (www.frac.org [March 22, 2005]); USDA Food and Nutrition Service (FNS) Nutrition Assistance Programs (available at www.fns.usda.gov/fns/ [May 21, 2005]).

Child Care Meals and Snacks:

The Child and Adult Care Food Program

The Child and Adult Care Food Program (CACFP) provides federal funds for meals and snacks served to children in licensed child care homes, child care centers, Head Start programs, after-school care programs, and homeless shelters (see table 1). The program, begun as a pilot program in 1968, became permanent in 1978 and is administered by the Department of Agriculture's Food and Nutrition Service through grants to the states. In most states, the state educational agency administers the program.²⁶

Participation and reach. In 2004, CACFP reached almost 2 million children a day in child care centers and Head Start programs and more than 913,000 children in family child care homes. More than 44,000 child care centers and 157,000 family child care homes participated. On an average day, CACFP served meals and snacks to 2.8 million children in these settings.²⁷

Eligibility. Programs that may participate in CACFP include eligible public or private nonprofit child care centers, for-profit child

care centers serving 25 percent or more low-income children, after-school programs, Head Start programs, and other institutions that are licensed or approved to provide day care services. Because family child care homes tend to be very small businesses, they can participate in CACFP only if they have a recognized sponsor to serve as an intermediary between them and the responsible state agency. Sponsors are responsible for recruiting, for determining that homes meet the

In 1996, welfare reform legislation changed the reimbursement structure for child care homes to target benefits more specifically to homes serving low-income children.

CACFP eligibility criteria, for providing training and other support to family child care providers, for monitoring homes to ensure they comply with federal and state regulations, for verifying the homes' claims for reimbursement, and for distributing the meal reimbursements to the homes.²⁸

Funding reimbursement is provided for up to two meals and one snack, or one meal and two snacks, for each child. The Department of Agriculture also makes available donated agricultural commodities or cash in lieu of commodities. Subsidies for food served to children in child care centers are calculated differently than for those paid to family and group day care homes. Under CACFP regulations, meals and snacks served to children in child care centers, Head Start, and outside-

of-school programs are reimbursed at rates based on a child's eligibility for free, reduced-price, or paid meals.²⁹ Children in Head Start programs categorically receive free meals and snacks, thus qualifying the Head Start center for the highest reimbursement rate.

Reimbursement for meals served in day care homes is based on eligibility for Tier I rates (which targets higher levels of reimbursement to low-income areas, providers, or children) or lower Tier II rates (not located in a low-income area nor operated by a low-income provider).³⁰ In 1996, welfare reform legislation changed the reimbursement structure for child care homes to target benefits more specifically to homes serving low-income children.³¹ As a result, the number of low-income children served in CACFP homes grew by 80 percent between 1995 and 1999, and the number of meal reimbursements for low-income children doubled.³² A family child care provider serving five low-income children can receive about \$4,000 a year in CACFP funds.³³ In fiscal year 2002, the program's total cost, including cash and commodity subsidies, administrative costs, and a payment to states for audits and oversight, was \$1.8 billion—\$100 million more than the previous year's expenditures.³⁴

Meal pattern requirements. To be eligible for federal reimbursement, providers must serve meals and snacks that meet established meal pattern requirements modeled on the food-based menu planning guidelines in the National School Lunch Program and School Breakfast Program. The meal patterns specify foods to be offered at each meal and snack as well as minimum portion sizes, which vary by age.³⁵ The four food categories are: milk; vegetables, fruit, or 100 percent juice; grains or breads; and meat and meat alternates. Fluid milk must be served at all meals and

Summary of Regulations and Funding for the Child and Adult Care Food Program

Regulations

The U.S. Department of Agriculture's Food and Nutrition Service administers the Child and Adult Care Food Program through grants to the states. Program standards include meal pattern requirements for children in defined age groups: one to two years, three to five years, and six to twelve years. The program also provides a separate meal pattern for infants.

To be eligible for reimbursement, breakfast, lunch, supper, and snacks must contain specified minimum amounts of foods from some or all of the following four components: milk, vegetable or fruit or full-strength (100 percent) juice, bread and grains, and meat and meat alternates. Foods and beverages served to children must be approved, or "creditable," to be reimbursed. The Department of Agriculture, state agencies, and sponsoring organizations make these determinations and issue guidelines and educational materials for providers.

Funding

The CACFP program is an entitlement program. As long as they follow regulations, participating nonresident child care centers and family or group day care homes are guaranteed to receive funds to offer free or reduced-price meals. In addition, outside-of-school programs are entitled to funds for snacks. The program is financed in two ways.

First, child care centers and outside-of-school programs receive a per-meal reimbursement, up to two meals and one snack (or two snacks and one meal), based on the family income of the child receiving the meal. The institution must determine each enrolled participant's eligibility for free and reduced-price meals. Children in families below 130 percent of the poverty line receive free meals. Children in families between 130 and 185 percent of the poverty line receive reduced-price meals. Children in families above 185 percent of the poverty line receive a small per-meal subsidy for full-price ("paid") meals.

The per-meal subsidies are indexed for inflation. In fiscal year 2006, the per-meal reimbursement rates in the forty-eight contiguous U.S. states are: \$1.27 for free breakfasts, \$2.32 for free lunches and suppers, and \$0.63 for free snacks; \$0.97 for reduced-price breakfasts, \$1.92 for reduced-price lunches and suppers, and \$0.31 for reduced-price snacks; and \$0.23 for paid breakfasts, \$0.22 for paid lunches and suppers, and \$0.05 for paid snacks.

Second, family and group day care homes receive reimbursement for up to two meals and one snack (or one meal and two snacks). To participate, family and group child care homes must have a public or private (nonprofit) sponsor. In this instance, the subsidy rate is determined by the area where the child care home is located or by the income level of the provider, with providers in low-income neighborhoods or with low incomes themselves receiving higher subsidies.

For fiscal year 2006 for the forty-eight contiguous U.S. states, Tier I homes, which are located in low-income districts or operated by a provider with a household income that is at or below 185 percent of the poverty line, are reimbursed at the rate of \$1.06 for breakfasts, \$1.96 for lunches and suppers, and \$0.58 for snacks. Tier II homes, which are not located in low-income districts nor operated by a low-income provider, are reimbursed at the rate of \$0.39 for breakfasts, \$1.18 for lunches and suppers, and \$0.16 for snacks. (A Tier II provider can apply for the Tier I rate for low-income children in the family child care home.)

Sources: *Code of Federal Regulations* 226.20; *Federal Register* 70, no. 136, July 18, 2005, pp. 41196-97.

Notes: Rates for both sets of financing are somewhat higher for Alaska and Hawaii. In addition to the rates for lunch and supper, institutions may also receive 17.5 cents in commodities (or cash in lieu of commodities) as additional assistance for each lunch and supper served.

may also be served as part of a snack. No requirements govern whether children older than two should be served whole, 2 percent, 1 percent, or skim milk. Milk and 100 percent fruit or vegetable juices are the only beverages that are reimbursable through the program. CACFP regulations pertain only to foods and beverages for which the provider is seeking federal reimbursement. They do not preclude providers from offering additional low-nutrition, high-calorie foods.

Need for improved nutritional quality in CACFP. CACFP meals and snacks are not required to meet specific nutrient-based standards such as those implemented in the mid-1990s for the school lunch and school breakfast meals.³⁶ The Healthy Meals for Healthy Americans Act of 1995 required that these school meals be consistent with the *Dietary Guidelines for Americans*, including fat and saturated fat content. Moreover, as noted, the CACFP regulations do not prevent providers from offering additional low-nutrition, high-calorie foods or beverages for which they are not seeking reimbursement. As with schools, comprehensive nutrition policies for the total child care food environment are needed.

Many child care facilities depend on CACFP to defray expenses, and many parents, especially low-income working families, depend on these settings for a substantial portion of their children's nutritional intake.³⁷ CACFP motivates a family child care home to become licensed, thus coming under applicable health, quality, and safety standards. It interacts regularly with family child care providers, providing monitoring, training, including nutrition education, and other assistance. Further, CACFP is an entitlement program, meaning that all eligible homes and centers must be allowed to partic-

ipate and that all eligible children being cared for in the homes and centers must be served. Immigrant status does not affect eligibility status. CACFP provides a basic nutritional safety net for low-income children. Strengthening the regulations to make CACFP meals, snacks, and beverages comply with the *Dietary Guidelines*, including fat and saturated fat content, could further improve children's nutrition and help prevent child obesity. Increasing the number of licensed family child care homes to enable them to participate in CACFP could extend healthful eating and quality child care to many more at-risk children.³⁸

Nutrition Quality of Foods in Child Care Settings

Surprisingly little research has been done to assess the nutritional quality of foods in child care settings. Most studies have focused on CACFP providers. A recent research review identified ten descriptive studies of CACFP in child care settings published between 1982 and 2004, four of which were national studies.³⁹ Because CACFP does not have nutrient-based standards, almost all of the studies have used the recommendations of the American Dietetic Association (ADA) as evaluation benchmarks. The ADA recommends that food served to children in care for a full day (eight hours or more) meet at least one-half to two-thirds of their daily needs for energy and nutrients and that food served to children in part-time care (four to seven hours) provide at least one-third of their daily needs. These benchmarks are requirements for the Head Start nutrition program.⁴⁰ The ADA also recommends that child care meals and snacks be consistent with the *Dietary Guidelines*.

The only comprehensive national study, done in 1995, collected meal and snack data on a

nationally representative sample of 1,962 CACFP-participating child care sites (family child care homes and child care centers, including Head Start centers) and food intake data on children aged five and older at 372 centers or homes. Nutrient analysis showed that the most common combinations of meals and snacks offered (breakfast, lunch, and one to two snacks) provided 61 to 71 percent of children's daily energy needs and more than two-thirds of the recommended dietary allowance for key nutrients. Meals and snacks had an average of 13 percent of calories from saturated fat, exceeding the *Dietary Guidelines* of no more than 10 percent. Few providers offered lunches that met the *Dietary Guidelines*' goals for total fat or saturated fat; 50 percent served lunches with more than 35 percent of the calories from fat. Providers that met the dietary fat recommendation were more likely to serve 1 percent or skim milk and fruit, and they were less likely to serve french fries, fried meats, hot dogs, cold cuts, and high-fat condiments. On average 90 percent of the breakfasts and 87 percent of the lunches complied with the meal pattern requirements. The food component most often missing from meals was fruits and vegetables.⁴¹

A 1999 national study of CACFP meals and snacks conducted in 542 Tier II child care homes (not located in a low-income area nor operated by a low-income provider) found that meals and snacks offered to children aged two and older provided, on average, more than two-thirds of the recommended dietary allowance for calories and key nutrients.⁴² Mean saturated fat content exceeded national recommendations. Less than one-third of the morning snacks (31 percent) and afternoon snacks (28 percent) included fresh, canned, or dried fruit. Less than 25 percent of day care homes offered any fresh fruit as

snacks. Only 3 percent of the afternoon snacks included vegetables.

The few smaller-scale studies that have evaluated the menus in child care settings, primarily CACFP sites, show cause for concern.⁴³ One study collected data on 171 child care centers that participated in CACFP in seven states.⁴⁴ It collected copies of menus and menu records for meals and snacks for ten consecutive days. Meal patterns were incon-

CACFP meals and snacks are not required to meet specific nutrient-based standards such as those implemented in the mid-1990s for the school lunch and breakfast meals.

sistent with the *Dietary Guidelines* regarding fat, sodium, fruits and vegetables, and serving a variety of foods. Menus were high in fat and seldom provided recommended servings of vegetables. Cookies were frequently on the menus. Another study evaluated menus in nine Texas child care centers participating in CACFP and found that only about half the centers included fresh produce; among those that did, the amount was frequently minimal. Food service staff did not always understand the CACFP requirements and had limited nutrition knowledge. One staff member said he never served fresh fruit because he didn't "know how far an apple will go," but he knew exactly how much applesauce to ladle from a can to make the minimum portion required by CACFP. Another staff member thought that bottled orange drink was "full-strength juice" because no water was added.⁴⁵

A recent study compared the dietary intakes of fifty children aged three to nine who attended nine child care centers in Texas with the recommendations of the Food Guide Pyramid for Young Children.⁴⁶ Researchers observed children's meals and snacks during child care for three consecutive days and took reports on dietary intakes of the children before and after child care from the parents. During child care, the three-year-olds ate enough fruit, but not enough grains, vegetables, or dairy to meet two-thirds of the Food Guide Pyramid for Young Children recommendations. The four- and five-year-old children consumed adequate dairy only. The vegetables and grains served most often were potatoes and refined flour products. Intakes at home did not compensate. These findings suggest that children attending child care centers are not getting adequate diets at child care centers or at home.

In summary, relatively little is known about the dietary quality and types of foods and beverages offered in child care facilities, especially those that are not licensed or regulated and do not participate in the CACFP program. The nutritional quality of meals and snacks may be poor. Increased attention should thus be paid to the nutritional adequacy of foods served in child care settings. More research is needed on the current food environment in child care, including what foods are served, their nutritional quality, and staff training on nutrition. It has been ten years since any national survey described the nutrient content of meals and snacks in child care centers and day care homes participating in CACFP, and that survey included only children older than five.⁴⁷ Given the increased number and use of child care facilities over the past decade, an updated national survey is needed to assess nutrition quality and practices, including types and portion

sizes of foods and beverages offered and consumed by children in child care settings.

Physical Activity

Physical activity is crucial to overall health and to obesity prevention.⁴⁸ Reduced physical activity is a likely contributor to increasing obesity rates among children of all ages.⁴⁹

Physical Activity Recommendations for Young Children

The 2005 *Dietary Guidelines* recommend that children and adolescents engage in at least sixty minutes of physical activity on most, preferably all, days of the week.⁵⁰ The National Association for Sport and Physical Education's guidelines recommend that toddlers get at least thirty minutes daily of structured physical activity and preschoolers should have at least sixty minutes. It also recommends that toddlers and preschoolers engage in at least sixty minutes a day of unstructured physical activity and not be sedentary for more than sixty minutes at a time except when sleeping. Thus, preschool-aged children should have at least two hours of exercise a day, half in structured physical activity and the remainder in unstructured, free-play settings.⁵¹ Children aged five to twelve should have at least sixty minutes of daily exercise.

To help meet the daily physical activity recommendations for preschoolers, experts recommend incorporating planned physical activity into the daily preschool schedule.⁵² Structured activity sessions should be short, about fifteen to twenty minutes, and should emphasize a wide variety of different movements.⁵³ States vary widely in their physical activity requirements for child care settings, but most address the subject in general, non-quantified terms. The failure to specify how much time children should spend being physically active is an overlooked opportunity to increase physical

activity among young children in settings where many spend much of their day.

Physical Activity in Child Care Settings

Surprisingly little is known about the activity levels of children in child care. Russell Pate and several colleagues used accelerometers, or small electronic devices worn around the waist, to record minute-by-minute activity levels of 281 children attending nine preschools (Head Start, church-based, and private) in South Carolina.⁵⁴ The children, who wore accelerometers for roughly 4.4 hours a day for an average of 6.6 days, participated in a mean of seven minutes an hour of moderate to vigorous physical activity (MVPA) at the preschools. Activity levels varied widely among schools, averaging from four to ten minutes an hour. The preschool that a child attended was a significant predictor of MVPA. The authors speculated that a child attending preschool for eight hours would engage in about one hour of MVPA and would be unlikely to engage in another hour of MVPA outside the preschool setting, suggesting that many preschool children may not be meeting physical activity recommendations. Another study assessed the physical activity level of 214 children aged three to five enrolled in ten child care centers in South Dakota. Each child wore an accelerometer for two continuous days (forty-eight hours).⁵⁵ The child care center was the strongest predictor of physical activity levels, with more than 50 percent of the daily activity counts occurring between 9 a.m. and 5 p.m. These studies suggest that school policies and practices greatly influence the overall physical activity of the nation's young children.⁵⁶ The quality and quantity of physical activity in child care settings can vary depending on indoor space, gross motor play equipment, outdoor play area, group size, and the education and training of child care staff.⁵⁷

The only study to evaluate weight-related differences in physical activity during the preschool day compared the physical activity of overweight and normal-weight three- to five-year-old children while attending preschool.⁵⁸ The study assessed 245 children, recruited from nine preschools, on multiple days while using both direct observation and accelerometers. It found that overweight boys were significantly less active than normal-weight boys, though it found no weight-related activ-

The 2005 Dietary Guidelines recommend that children and adolescents engage in at least sixty minutes of physical activity on most, preferably all, days of the week.

ity differences in girls. Overweight children may thus be at increased risk for further gains in body fat because of low physical activity levels during the preschool day.

Another study of 266 three- to five-year-old children from nine preschools found that preschool policies and practices influenced children's physical activity.⁵⁹ Children in preschools with frequent field trips (four or more a month) and college-educated teachers had significantly higher levels of MVPA. Children in higher-quality preschools, measured by the number of children per classroom, the educational backgrounds of the teachers, and specific features of the facilities, had lower levels of sedentary behavior. Similar levels of physical activity were observed in private, church-based, and Head Start preschool settings. On average, the children failed to meet

current recommendations for physical activity.⁶⁰ Children in this study were engaged in MVPA about 27 percent of the time, meaning that on average they would have about thirty-two minutes of MVPA in two play periods lasting an hour each. Most notably, the study found higher levels of physical activity in preschools with policies and practices that promoted physical activity.

We could find no studies that assessed children's television and video viewing and computer use in child care centers or day care homes, although it has been reported that children spend more time watching TV in child care homes than in centers.⁶¹ Many studies have found a positive link between children's television viewing and obesity, and the American Academy of Pediatrics recommends limiting children's total television viewing time to no more than one to two hours of quality programming a day.⁶² Future studies should examine television policies and practice in child care facilities.

Research has found that many preschool-aged children are not meeting the recommended guidelines of two hours of physical activity a day and that children in child care settings need more physical activity.⁶³ How active children are in preschools is largely determined by how much time they have to play freely in settings conducive to physical activity, such as outdoor playgrounds, parks, or gyms. One way to ensure that preschoolers get adequate exercise is to provide more time in free-play settings and add structured physical activity to their program.⁶⁴ As yet, however, no broad policies govern physical activity for preschool children in child care. Although several national groups have published recommendations, no requirements exist at the federal level. Physical activity policies, where they exist, are set by states and facilities.

Obesity-Prevention Interventions in Preschool Settings

Child care settings offer untapped opportunities for developing and evaluating effective obesity-prevention strategies to reach both children and their parents. But we could locate few published obesity-prevention studies with preschool children.⁶⁵ In *Hip-Hop to Health Jr.*, a study of twelve Chicago Head Start preschool programs serving minority children, children in half the preschools participated in a fourteen-week (forty minutes three times a week) program of healthful eating and exercise. Their parents received weekly newsletters with information mirroring the children's curriculum. Children in the other six preschools served as a control group. Children in the program had significantly smaller increases in BMI than did children in the control group at both the one-year and two-year follow-ups.⁶⁶ But the study found no significant treatment group differences in food intake or physical activity.

Another study worth noting—and one with implications for obesity-prevention programs—is the “Healthy Start” project. A cardiovascular risk-reduction study involving 1,296 low-income, predominantly minority preschool children in nine Head Start centers in New York, the project modified the food service in some centers and left food service in some centers unchanged as a control.⁶⁷ The food service intervention reduced the fat and saturated fat content of preschool meals and reduced children's consumption of saturated fat while at preschool without compromising their intake of energy and essential nutrients, thus demonstrating the feasibility of an intervention to change food service in child care centers.

School-based interventions to reduce television watching in elementary school children,

including one conducted by T. N. Robinson, have reported reductions in body fat.⁶⁸ One intervention, which involved preschoolers from 2.6 to 5.5 years old, almost all of whom were white, aimed to reduce at-home television viewing.⁶⁹ Children in eight child care centers received a seven-session program to reduce television viewing as part of a health-promotion curriculum; children in eight control centers received a safety and injury-prevention program. Parents were given take-home educational materials and participated in parent-child activities. Parents reported that children in the intervention group watched television at home an average of 4.7 hours less a week than children in the control group—a reduction similar to those reported by Robinson.⁷⁰ But children in the intervention and in the control group had no significant differences in body fat. Longer and more intensive interventions that target other modifiable obesity risk factors may yield greater results.

Reducing consumption of sweetened beverages, including juice, both in child care settings and at home may be an effective obesity-prevention strategy. Several studies indicate that sweetened beverages may contribute to the increased prevalence of obesity among preschool children. One analysis of National Health and Nutrition Examination Survey data found a positive link between the consumption of carbonated soft drinks and overweight in all age groups, including two- to five-year-olds.⁷¹ Another examined the association between sweet drink consumption and overweight among 10,904 low-income preschool children aged two and three at baseline and then looked at their weight and height one year later.⁷² Sweet drinks included juices, fruit drinks, and sodas. Forty-one percent of the children consumed these drinks at least three times a day. Energy intake in-

creased as the consumption of sweet drinks increased. For example, those who consumed less than one drink a day had a mean intake of 1,425 calories a day, as against 2,005 calories a day for those who consumed three or more a day. Preschool children who were at risk for overweight or who were overweight at baseline and who consumed more than

Reducing consumption of sweetened beverages, including juice, both in child care settings and at home may be an effective obesity-prevention strategy.

one drink a day were significantly more likely to become or remain overweight.

A cross-sectional study in 1997 found that two- to five-year-old children who drank twelve or more ounces of fruit juice a day were more likely (32 percent as against 9 percent) to be obese than those who drank less juice.⁷³ Not all studies have found a link between juice consumption and overweight, but the American Academy of Pediatrics recommends that children aged one to six drink no more than four to six ounces of fruit juice a day.⁷⁴ Fruit juice and fruit drinks are easily overconsumed by toddlers and young children because they taste good. They are also conveniently packaged and can be carried around during the day. Because juice is viewed as nutritious, child care providers or parents may not set limits. Like soda, however, it can contribute to obesity. Whole fruit should be encouraged as an alternative because of the fiber benefit and because whole fruit takes longer to eat.

It is not known how much sweetened beverages or juice children consume in child care settings and at home. National data indicate that energy intake, added sugar as a share of total energy, and excess juice consumption (more than six ounces a day) increased significantly among preschoolers between 1977 and 1998.⁷⁵ Researchers need to assess sweetened beverage intake among preschoolers in child care facilities and to conduct interventions to remove fruit drinks and soda from child care, to limit juice to six ounces a day, and to examine the effect on weight status.

Head Start

Head Start, a federal preschool program serving infants and children up to age five, includes a varied mix of programs—education, health, nutrition, social services, and parental involvement—that presents a unique opportunity to combat childhood obesity. Created in 1965, Head Start was designed to help break the cycle of poverty by providing preschool children of low-income families with a comprehensive program to meet their educational, emotional, social, health, and nutritional needs.⁷⁶ In 2003, 19,200 Head Start sites throughout the country reached more than 900,000 children. The program is racially diverse, and most children are three (34 percent) or four (53 percent) years old.⁷⁷ Although Head Start has touched millions of children's lives, it reaches only about 40 percent of those who are eligible.⁷⁸

One objective of Head Start is to ensure that all children are linked to an ongoing source of health care.⁷⁹ The emphasis on continuous primary care means that children's height and weight are monitored and that parents receive guidance on nutrition and physical activity. Head Start maintains a Child Health Record for each child and requires a health screening within forty-five days of enrollment.⁸⁰ Al-

though each child's height and weight are measured and BMI calculated as part of a routine health examination, it is not clear how these data are used on an individual basis or what information is given to the parents. Nor is it clear whether the BMI data collected are analyzed at a state or national level or used for surveillance or monitoring.

Head Start is also a vital source of nutrition for low-income children. Its federal performance standards require that its meals and snacks provide at least one-third of the daily nutritional needs of children in a part-day center-based setting and one-half to two-third of the needs of children in a full-day program.⁸¹ Head Start sites participate in the CACFP program and must have a registered dietitian review and evaluate their menus. Performance standards also require that parent education activities include "opportunities to assist individual families with food preparation and nutritional skills."⁸²

Head Start's federal regulations also require that settings provide opportunities for outdoor and indoor active play, adequate indoor and outdoor space, equipment for active play, and opportunities to develop gross and fine motor skills. The regulations do not specify the amount, frequency, and type of physical activity. No standards or rules govern television use.

Overall, evaluations of Head Start show many benefits for children, families, and communities, though little research has focused on obesity prevention.⁸³ The only published study to date is Hip-Hop to Health Jr., described above.⁸⁴ Because of its multiple components and because it serves low-income, multiethnic children who are at high risk of overweight, Head Start could well be used to strengthen and expand obesity-prevention efforts. The program has national reach and could signifi-

An Innovative State Program

A promising pilot intervention called Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) was launched in North Carolina in 2003.¹ Funded by the Centers for Disease Control and the N.C. Department of Health and Human Services, the program's goal is to promote healthful eating and physical activity in young children in child care and preschool settings. The intervention examines the feasibility of using local health professionals to help child care centers assess and improve their nutrition and physical activity environments. The state implemented the pilot in fifteen child care centers, with four control centers. Using an assessment tool with nine nutrition and six physical activity areas, centers self-assessed their policies and practices. Based on the assessments, center staff identified specific areas for improvement. Local health professionals conducted workshops for the center staff and provided ongoing support and technical assistance. The second phase of the project is now under way in 102 child care centers.

1. Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) Website (www.napsacc.org [March 25, 2005]).

cantly improve healthful eating and physical activity patterns of young children. Interventions and policy changes could focus on ensuring that meals and snacks adhere to the *Dietary Guidelines*, that physical activity is increased, and that parents are actively involved. BMI screening results could be provided to parents and health providers and could be used for surveillance on state and national levels.

Regulation of Child Care Programs

With the exception of Head Start, the states regulate child care facilities. Each state sets and enforces specific health and safety requirements, which regulated providers must meet to operate legally.⁸⁵ All states set minimum health, safety, and nutrition standards for providers. They generally regulate child care homes through licensing, registration, and certification. Most states require family child care providers to be licensed if they care for more than four children. In many states, licensing or registration is voluntary for providers caring for four or fewer children. Almost all child care centers are regulated or licensed in some way.⁸⁶

No uniform quality standards govern all child care and early education programs nation-

wide, and many programs are exempt from any regulation or licensing requirements.⁸⁷ Although regulations vary across states, they focus mostly on basic safety and health requirements, such as keeping smoke detectors in working order; locking cabinets that contain dangerous materials; specifying the minimum area for indoor or outdoor space, staff-child ratios, the minimum age of caregivers, and preservice training qualifications and in-service requirements for staff; and ensuring that children's immunizations are up to date.⁸⁸ Regulations regarding nutrition, physical activity, and media use vary widely across the states and are reviewed below. The American Dietetic Association, American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care have published recommendations, performance standards, and benchmarks for nutrition, food service, and developmentally appropriate activities in child care settings.⁸⁹

Although setting and enforcing child care requirements are primarily state and local responsibilities, the federal government requires states to have basic safety and health regulations in place to receive funds from the

Child Care and Development Block Grant. This federal program subsidizes child care costs for low-income families, helping them afford quality child care and removing a barrier to parental employment.⁹⁰ It is a significant public investment. In 2004, the government provided \$4.8 billion.⁹¹ To get these funds, states must certify that health and safety requirements are in place and that both regulated and nonregulated providers being paid with block grant funds are in compliance. Washington does not, however, stipulate the contents of the requirements or the means to enforce them, and states vary widely on these points.

Nonregulated Child Care Providers

Most states do not regulate all types of child care providers. Nonregulated providers need not comply with state regulations and are not subject to state enforcement. Some family child care providers caring for small numbers of children are also exempt from regulation, and some states exempt certain types of center-based programs, such as those run by religious groups, school-based preschool, school-based after-school programs, or centers operating part-day or part-year only.⁹² Nonregulated providers who receive funds from the federal block grant must, however, meet state and local health and safety requirements.

National advocacy groups have expressed concern about the gaps in child care regulation. The National Health and Safety Performance Standards for Out-of-Home Child Care assert that “every state should have a statute that identifies the regulatory agency and mandates the licensing and regulation of all full-time and part-time out-of-home care of children, regardless of setting, except care provided by parents or legal guardians, grandparents, siblings, aunts, or uncles or when a family engages an individual to care solely for

their children.”⁹³ The National Association for the Education of Young Children states that “any program providing care and education to children from two or more unrelated families should be regulated; there should be no exemptions from this principle.”⁹⁴

Regulatory Enforcement

The state child care licensing office enforces its state’s child care regulations. With current tight fiscal climates in most states and competing priorities for limited funds, states must make choices about the extent to which they can reasonably carry out this enforcement and the types of providers who will be affected.⁹⁵ Regulatory systems in many states are not funded to enforce licensing regulations effectively.⁹⁶ Regulatory burdens also affect providers, and costs can be passed along to parents. Providers may choose to leave the market—or choose not to be licensed—if regulatory practices become too cumbersome.

Regulations Governing Food, Physical Activity, and Media Use

The National Resource Center for Health and Safety in Child Care, part of the U.S. Department of Health and Human Services, Health Resources and Services Administration, maintains a website that provides links to the complete child care licensing standards for all fifty states and the District of Columbia.⁹⁷ Using this website, we recently conducted an analysis of state child care licensing standards for nutrition, physical activity, and media use. We examined licensing regulations for child care centers, small family child care homes (typically caring for six or fewer children), and large family and group child care homes (usually with seven to twelve children).

We found not only that regulations vary considerably from state to state but that, within a state, regulations may vary for different types

of child care settings. Typically child care centers are most heavily regulated, followed by large family and group child care homes, with small family child care homes the least heavily regulated. As noted, many states exempt small family child care homes from licensing requirements and instead rely on voluntary registration. Five states—Delaware, Georgia, Illinois, Mississippi, and Tennessee—have particularly comprehensive policies on nutrition, physical activity, and media use. In the following discussion of licensing regulations in these areas, we describe a state as having a specific regulation if the regulation is mandatory in at least one child care setting.

Nutrition

State nutrition regulations vary widely. Thirty states require the Child and Adult Care Food Program meal patterns or have similar requirements. Fifteen states specify the share of children's daily nutritional requirements to be provided per meal or based on the length of time in care, and twenty-one states specify the number of meals and snacks to be offered to children based on length of time in care. Just two states, Michigan and West Virginia, require that meals and snacks must follow the *Dietary Guidelines for Americans*. Mississippi regulations refer to the *Dietary Guidelines*, noting that they can "provide assistance in planning meals for ages two (2) and older, which will promote health and prevent disease."⁹⁸ Ten states limit foods and beverages of low nutritional value. Five states regulate vending machines. Alabama, Georgia, and Louisiana prohibit vending machines in areas used by children. Arkansas permits vending machines in school-age settings provided they are not the only source of snacks and beverages. Mississippi requires food in vending machines to meet the state's nutrition regulations for meals and snacks in child care settings.

Physical Activity

Most states specify that the daily program should promote physical development, including large and small muscle activity; have a balance of active and quiet activities, indoor and outdoor activities, and individual and group activities; include age- and developmentally appropriate activities, equipment, and supplies; and provide enough materials and equipment to avoid excessive competition and long waits. Thirty-three states and the District of Columbia require that the program provide large muscle, or gross motor, activity or development. Nine states require "vigorous" physical activity for children. No states use the term "moderate" to describe the appropriate level of activity. Just two states, Alaska and Massachusetts, specify how long children should engage in physical activity. Alaska mandates "a minimum of 20 minutes of vigorous physical activity for every three hours the facility is open between the hours of 7:00 a.m. and 7:00 p.m." Massachusetts calls for "thirty minutes of physical activity every day." Alaska's regulations pertain to all types of child care settings; the Massachusetts rule affects only child care homes.

Thirty-eight states and the District of Columbia require that children in child care centers and homes have time outdoors each day, health and weather permitting. Eight of these states and the District of Columbia specify how long children should be outdoors; most require at least one hour a day. The District of Columbia and Mississippi require the most daily outdoor time—two hours for a full-day program and at least thirty minutes for a part-day program.

Media Use

Twenty-two states regulate media use, including television, computer, video, video game, radio, and electronic game use. Most

simply define appropriate or inappropriate content or define acceptable use of media within the program of activities (for example, media should be used with discretion and not as a substitute for planned activities). Only nine states specify time limits on screen time. Five set a maximum of two hours a day; the others allow less time.

Quality Child Care

Most children in the United States now spend some time in child care during their critical developmental years. A body of evidence has accumulated to show that the quality of care has a lasting impact on a child's well-being and ability to learn.⁹⁹ High-quality care and early education help children prepare for school, ready to succeed; improve their skills; and stay safe while their parents work.¹⁰⁰ But quality care arrangements are hard to find, particularly for low-income parents.¹⁰¹ Much of the care available in the United States is poor to mediocre.¹⁰²

Strong state licensing requirements, expanded to apply to most care settings, can help ensure children's health and well-being. Stricter licensing requirements, such as low staff-to-child ratios and adequate training for providers, can help improve the quality of care. Providers who care for children on a regular basis play an essential role in children's development and experiences.¹⁰³ Properly trained and educated teachers enhance children's development. Recruiting and retaining qualified staff pose significant challenges, however, when providers' salaries average \$17,610 a year, often without benefits or paid leave.¹⁰⁴ Most states do not require providers to have even a basic knowledge of child development, and they require little or no training before allowing providers to work with children. Several national organizations have called for uniform training

for providers on specific content areas, including nutrition, child growth and development, and health and safety.¹⁰⁵ The American Dietetic Association recommends that child care providers and food service personnel receive appropriate nutrition and food service training.¹⁰⁶ We found no recommendations for training relating specifically to physical activity, though children in preschools with better-educated teachers have been found to have significantly higher levels of MVPA.¹⁰⁷

Recommendations for Child Care Settings

Largely ignored in the nation's obesity dialogue so far has been the food and physical activity environment in child care settings. But child care represents an untapped rich source of strategies to help children acquire positive healthy habits to prevent obesity. The infrastructure already exists within Head Start and CACFP child care sites to incorporate healthful eating and exercise into these programs, thus reaching many low-income and minority children who are at greatest risk for obesity. But regulations and standards governing physical activity and nutrition need to be strengthened. Child care settings also offer a way to reach parents to make healthful changes at home to reinforce and support healthful eating and regular exercise. The box on the following page lists strategies for creating a healthful environment in child care settings to improve physical activity and eating behaviors to prevent obesity in young children.

Conclusions

The early years spent in child care are crucially important to a child's development. High-quality child care and early education help ensure that a child will develop skills and enter school ready to learn.¹⁰⁸ For a young child, health and education are inseparable. Eating nutritious foods and engaging

Strategies for Achieving a More Healthful Food and Physical Activity Environment in Child Care Settings

Policy Goals

At the federal level, Congress should require all meals and snacks offered by the Child and Adult Care Food Program to meet the *Dietary Guidelines for Americans*. Regulations would apply to all providers in participating child care centers, family child care facilities, and after-school care programs.

States should develop nutrition and physical activity policies for licensed child care facilities that address healthful eating, physical activity, and media use. Policies should also address nutrition and physical activity training for staff and nutrition training for food service staff.

At the local level, licensed preschool and child care facilities should have written nutrition policies that follow the *Dietary Guidelines for Americans* for meals, snacks, and beverages. They should also have written policies to ensure adequate, developmentally appropriate physical activity and to limit screen time.

Research Goals

Researchers should pursue four primary goals. First, they should develop, implement, and evaluate innovative intervention programs focused on promoting healthful eating and physical activity and on preventing obesity in child care facilities, especially facilities serving low-income and minority children who are at highest risk. Second, they should conduct descriptive environmental studies in child care centers, Head Start, and licensed day care homes to assess the food environment (the types and amounts of foods and beverages served for meals and snacks), the physical activity environment (the amount and type of physical activity), and media use. Third, they should conduct a national study of child care programs on the dietary quality of meals and snacks served and how they compare to the *Dietary Guidelines for Americans* and Dietary Reference Intakes. And finally they should evaluate methods to increase parental involvement, to change parental behavior, and to change the home environment through child care–based obesity-prevention interventions.

in physical activity on a daily basis are two essential elements for healthy well-being in the early years. Child care settings can and should provide an environment in which young children are offered nutritious foods and regular physical activity through structured and unstructured play so that they learn these healthful lifestyle behaviors at an early age. Child care homes and centers offer many opportunities to form and support healthful eating habits and physical activity patterns in young children. Thus they can

play a critical role in laying a foundation for healthy weight. The number of children in the United States aged four and younger is expected to grow by 1.2 million over the next decade, for a 6 percent rise. The number of working parents who depend on child care services is also expected to grow.¹⁰⁹ To help stem the childhood obesity epidemic, the nation must pay more attention to the food and physical activity offered in various child care settings.

Notes

1. U.S. Department of Health and Human Services, *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity* (Rockville, Md.: 2001); A. A. Hedley and others, "Prevalence of Overweight and Obesity among U.S. Children, Adolescents, and Adults, 1999–2002," *Journal of the American Medical Association* 291, no. 23 (2004): 2847–50.
2. National Center for Education Statistics, *Child Care and Early Education Program Participation of Infants, Toddlers, and Preschoolers* (Washington: U.S. Department of Education, 1996).
3. Robert C. Fellmeth, "The Child Care System in the United States," in *Health and Welfare for Families in the 21st Century*, edited by Helen M. Wallace, Gordon Green, and Kenneth J. Jaros (Sudbury, Mass.: Jones & Bartlett Publishers, 2003).
4. Eugene Smolensky and Jennifer Appleton Gootman, eds., Committee on Family and Work Policies, National Research Council (U.S.), *Working Families and Growing Kids: Caring for Children and Adolescents* (Washington: National Academies Press, 2003).
5. U.S. Department of Health and Human Services, *Child Health USA 2002* (Rockville, Md.: 2003).
6. Food Research and Action Center, "State of the States, 2005: A Profile of Food and Nutrition Programs across the Nation" (www.frac.org [March 22, 2005]).
7. M. Cubed, *The National Economic Impacts of the Child Care Sector*, National Child Care Association, fall 2002 (www.nccanet.org/NCCA%20Impact%20Study.pdf [July 29, 2005]).
8. Children's Foundation and National Association for Regulatory Administration, "Family Child Care Licensing Study" (<http://128.174.128.220/egi-bin/IMS/Results.asp> [March 22, 2005]).
9. Smolensky and Gootman, eds., *Working Families and Growing Kids* (see note 4).
10. National Association for the Education of Young Children, "Licensing and Public Regulation of Early Childhood Programs: A Position Statement of the National Association for the Education of Young Children" (Washington, 1998).
11. Children's Defense Fund, "Child Care Basics" (www.childrensdefense.org/earlychildhood/childcare/child_care_basics_2005.pdf [May 21, 2005]).
12. J. Capizzano and G. Adams, "The Hours That Children under Five Spend in Child Care: Variation across States," no. B-8 (Washington: Urban Institute, 2000).
13. Smolensky and Gootman, eds., *Working Families and Growing Kids* (see note 4).
14. National Center for Education Statistics, *National Household Education Survey 2001* (Washington: U.S. Department of Education, 2002).
15. Cubed, *The National Economic Impacts of the Child Care Sector* (see note 7).
16. *Ibid.*
17. Smolensky and Gootman, eds., *Working Families and Growing Kids* (see note 4).
18. *Ibid.*

19. Jeffrey Koplan, Catharyn T. Liverman, and Vivica I. Kraak, *Preventing Childhood Obesity: Health in the Balance* (Washington: National Academies Press, 2005).
20. National Academy of Sciences, Food and Nutrition Information Center, National Research Council, *Dietary Reference Intakes (DRI) and Recommended Dietary Allowances (RDA)* (www.nal.usda.gov/fnic/etext/000105.html) [August 15, 2005].
21. U.S. Department of Health and Human Services and U.S. Department of Agriculture, *Dietary Guidelines for Americans, 2005*, 6th ed. (Government Printing Office, 2005).
22. U.S. Department of Health and Human Services, *Healthy People 2010: Understanding and Improving Health*, 2nd ed. (GPO, 2000).
23. S. Kranz, A. M. Siega-Riz, and A. H. Herring, "Changes in Diet Quality of American Preschoolers between 1977 and 1998," *American Journal of Public Health* 94, no. 9 (2004): 1525–30.
24. B. Devaney and others, "Nutrient Intakes of Infants and Toddlers," *Journal of the American Dietetic Association* 104, no. 1, suppl. 1 (2004): S14–S21.
25. M. K. Fox and others, "Feeding Infants and Toddlers Study: What Foods Are Infants and Toddlers Eating?" *Journal of the American Dietetic Association* 104, no. 1, suppl. 1 (2004): S22–S30.
26. U.S. Department of Agriculture, Food and Nutrition Service, "Child and Adult Care Food Program" (www.fns.usda.gov/cnd/care/cacfp/cacfphome.htm) [March 5, 2005].
27. Food Research and Action Center, "State of the States, 2005" (see note 6).
28. F. Glanz, "Child and Adult Care Food Program, 2004," in *Effects of Food Assistance and Nutrition Programs on Nutrition and Health*, vol. 3: *Literature Review*, edited by M. K. Fox, W. Hamilton, and B. H. Lin. Food Assistance and Nutrition Research Report no. 19-3 (Washington: U.S. Department of Agriculture, Economic Research Service, 2004).
29. For example, for July 2003–04, subsidies for children with family incomes below 130 percent of the poverty line were 60 cents for each snack, \$1.20 for each breakfast, and \$2.19 for each lunch or supper. For children with family incomes between 130 percent and 185 percent of the poverty line, subsidies were 30 cents for snacks, 90 cents for breakfast, and \$1.79 for lunch or supper; for children with family incomes above 185 percent of the poverty line, subsidies were 5 cents for snacks, 22 cents for breakfast, and 21 cents for lunch or supper. These amounts are indexed yearly for inflation. Committee on Ways and Means, U.S. House of Representatives, *2004 Green Book* (GPO, 2004), section 15, pages 15–117.
30. U.S. Department of Agriculture, Food and Nutrition Service, "Child and Adult Care Food Program" (see note 26).
31. Glanz, "Child and Adult Care Food Program, 2004" (see note 28).
32. *Ibid.*
33. Food Research and Action Center, "State of the States, 2005" (see note 6).
34. Committee on Ways and Means, *2004 Green Book*, pages 15–116 (see note 29).
35. U.S. Department of Agriculture, Food and Nutrition Service, "Child and Adult Care Food Program" (see note 26).

36. Glanz, "Child and Adult Care Food Program, 2004" (see note 28).
37. Lynn Parker, "The Federal Nutrition Programs: A Safety Net for Very Young Children," *Zero to Three* 21, no. 1 (2000): 29–36.
38. Ibid.
39. Glanz, "Child and Adult Care Food Program, 2004" (see note 28).
40. American Dietetic Association, "Position of the American Dietetic Association: Nutrition Standards for Child-Care Programs," *Journal of the American Dietetic Association* 99, no. 8 (1999): 981–88; American Dietetic Association, "Position of the American Dietetic Association: Benchmarks for Nutrition Programs in Child Care Settings," *Journal of the American Dietetic Association* 105, no. 6 (2005): 979–86; U.S. Department of Health and Human Services, Administration for Children and Families, Head Start Bureau, *Head Start Program Performance Standards and Other Regulations* (Washington, 2005).
41. M. K. Fox and others, *Early Childhood and Child Care Study: Nutritional Assessment of the CACFP*, vol. 2: *Final Report* (Washington: U.S. Department of Agriculture, Food and Consumer Service, 1997).
42. Ibid.
43. M. E. Briley, C. Roberts-Gray, and S. Rowe, "What Can Children Learn from the Menu at the Child Care Center?" *Journal of Community Health* 18, no. 6 (1993): 363–77; M. E. Briley, C. Roberts-Gray, and D. Simpson, "Identification of Factors That Influence the Menu at Child Care Centers: A Grounded Theory Approach," *Journal of the American Dietetic Association* 94, no. 3 (1994): 276–81; C. B. Oakley and others, "Evaluation of Menus Planned in Mississippi Child-Care Centers Participating in the Child and Adult Care Food Program," *Journal of the American Dietetic Association* 95, no. 7 (1995): 765–68.
44. Briley, Roberts-Gray, and Rowe, "What Can Children Learn" (see note 43).
45. Briley, Roberts-Gray, and Simpson, "Identification of Factors" (see note 43).
46. A. Padgett and M. E. Briley, "Dietary Intakes at Child-Care Centers in Central Texas Fail to Meet Food Guide Pyramid Recommendations," *Journal of the American Dietetic Association* 105, no. 5 (2005): 790–93.
47. Fox and others, *Early Childhood and Child Care Study* (see note 41).
48. Department of Health and Human Services and Department of Agriculture, *Dietary Guidelines for Americans, 2005* (see note 21); Department of Health and Human Services, *Healthy People 2010* (see note 22).
49. Russell R. Pate and others, "Physical Activity among Children Attending Preschools," *Pediatrics* 114, no. 5 (2004): 1258–63.
50. Department of Health and Human Services and Department of Agriculture, *Dietary Guidelines for Americans, 2005* (see note 21).
51. National Association for Sport and Physical Education, *Active Start: A Statement of Physical Activity Guidelines for Children Birth to Five Years* (Reston, Va.: National Association for Sport and Physical Education, 2002).
52. M. Dowda and others, "Influences of Preschool Policies and Practices on Children's Physical Activity," *Journal of Community Health* 29, no. 3 (2004): 183–96.

53. National Association for Sport and Physical Education, *Active Start* (see note 51); American Academy of Pediatrics, Committee on Sports Medicine and Fitness and Committee on School Health, "Organized Sports for Children and Preadolescents," *Pediatrics* 107 (2001): 1459–62.
54. Pate and others, "Physical Activity among Children" (see note 49).
55. K. Finn, N. Johannsen, and B. Specker, "Factors Associated with Physical Activity in Preschool Children," *Journal of Pediatrics* 140, no. 1 (2002): 81–85.
56. Pate and others, "Physical Activity among Children" (see note 49).
57. Dowda and others, "Influences of Preschool Policies" (see note 52); Finn, Johannsen, and Specker, "Factors Associated with Physical Activity" (see note 55).
58. S. G. Trost and others, "Physical Activity in Overweight and Nonoverweight Preschool Children," *International Journal of Obesity & Related Metabolic Disorders* 27, no. 7 (2003): 834–39.
59. Dowda and others, "Influences of Preschool Policies" (see note 52).
60. National Association for Sport and Physical Education, *Active Start* (see note 51).
61. Smolensky and Gootman, eds., *Working Families and Growing Kids* (see note 4).
62. American Academy of Pediatrics, "Children, Adolescents, and Television," *Pediatrics* 107, no. 2 (2001): 423–26.
63. Dowda and others, "Influences of Preschool Policies" (see note 52); Pate and others, "Physical Activity among Children" (see note 49); Finn, Johannsen, and Specker, "Factors Associated with Physical Activity" (see note 55).
64. Dowda and others, "Influences of Preschool Policies" (see note 52); Pate and others, "Physical Activity among Children" (see note 49).
65. M. L. Fitzgibbon and others, "Two-Year Follow-up Results for Hip-Hop to Health Jr.: A Randomized Controlled Trial for Overweight Prevention in Preschool Minority Children," *Journal of Pediatrics* 146, no. 5 (2005): 618–25; M. L. Fitzgibbon and others, "A Community-Based Obesity Prevention Program for Minority Children: Rationale and Study Design for Hip-Hop to Health Jr.," *Preventive Medicine* 34, no. 2 (2002): 289–97.
66. Fitzgibbon and others, "Two-Year Follow-up Results" (see note 65). The difference at the one-year follow-up was 0.06 vs. 0.59 kg/m²; the difference at the two-year follow-up was 0.54 vs. 1.08 kg/m².
67. Christine L. Williams and others, "Cardiovascular Risk Reduction in Preschool Children: The 'Healthy Start' Project," *Journal of the American College of Nutrition* 23, no. 2 (2004): 117–23; C. L. Williams and others, "'Healthy-Start': Outcome of an Intervention to Promote a Heart Healthy Diet in Preschool Children," *Journal of the American College of Nutrition* 21, no. 1 (2002): 62–71.
68. T. N. Robinson, "Reducing Children's Television Viewing to Prevent Obesity: A Randomized Controlled Trial," *Journal of the American Medical Association* 282, no. 16 (1999): 1561–67; S. L. Gortmaker and others, "Reducing Obesity via a School-Based Interdisciplinary Intervention among Youth: Planet Health," *Archives of Pediatrics and Adolescent Medicine* 153, no. 4 (1999): 409–18.

69. B. A. Dennison and others, "An Intervention to Reduce Television Viewing by Preschool Children," *Archives of Pediatrics & Adolescent Medicine* 158, no. 2 (2004): 170–76.
70. Robinson, "Reducing Children's Television Viewing" (see note 68).
71. R. P. Troiano and others, "Energy and Fat Intakes of Children and Adolescents in the United States: Data from the National Health and Nutrition Examination Surveys," *American Journal of Clinical Nutrition* 72, no. 5, suppl. (2000): S1343–S53.
72. J. A. Welsh and others, "Overweight among Low-Income Preschool Children Associated with the Consumption of Sweet Drinks: Missouri, 1999–2002," *Pediatrics* 115, no. 2 (2005): e223–29.
73. B. A. Dennison, H. L. Rockwell, and S. L. Baker, "Excess Fruit Juice Consumption by Preschool-Aged Children Is Associated with Short Stature and Obesity," *Pediatrics* 99, no. 1 (1997): 15–22. Erratum appears in *Pediatrics* 100, no. 4 (1997): 733.
74. American Academy of Pediatrics, Committee on Nutrition, "The Use and Misuse of Fruit Juice in Pediatrics," *Pediatrics* 107, no. 5 (2001): 1210–13.
75. Kranz, Siega-Riz, and Herring, "Changes in Diet Quality" (see note 23).
76. U.S. Department of Health and Human Services, Administration for Children and Families, Head Start Bureau, "About Head Start" (www.acf.hhs.gov/programs/hsb/about [March 22, 2005]).
77. U.S. Department of Health and Human Services, Administration for Children and Families, Head Start Bureau, "Head Start Fact Sheets" (www.acf.hhs.gov/programs/hsb/research/factsheets.htm [March 22, 2005]).
78. Smolensky and Gootman, eds., *Working Families and Growing Kids* (see note 4).
79. U.S. Department of Health and Human Services, Administration for Children and Families, Head Start Bureau, *Head Start Program Performance Standards and Other Regulations* (Washington, 2005).
80. Ibid.
81. Ibid.
82. Ibid.
83. Wallace, Green, and Jaros, eds., *Health and Welfare for Families in the 21st Century* (see note 3).
84. Fitzgibbon and others, "Two-Year Follow-up Results" (see note 65).
85. U.S. General Accounting Office, *Child Care: State Efforts to Enforce Safety and Health Requirements*, GAO/HEHS-00-28 (Washington, January 2000).
86. Sandra L. Hofferth, "Child Care in the United States Today," *Future of Children* 6, no. 2 (1996): 41–61.
87. H. Blank, "Challenges of Child Care," in *About Children: An Authoritative Resource on the State of Childhood Today*, edited by A. G. Cosby and others (Elk Grove Village, Ill.: American Academy of Pediatrics, 2005).
88. U.S. General Accounting Office, *Child Care* (see note 85); Hofferth, "Child Care in the United States Today" (see note 86).

89. American Dietetic Association, "Position of the American Dietetic Association: Nutrition Standards" (see note 40); American Dietetic Association, "Position of the American Dietetic Association: Benchmarks for Nutrition Programs" (see note 40); American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care, *Caring for Our Children: National Health and Safety Performance Standards—Guidelines for Out-of-Home Child Care*, 2nd ed. (Elk Grove Village, Ill.: 2002).
90. U.S. General Accounting Office, *Child Care* (see note 85).
91. Children's Defense Fund, "Child Care Basics" (see note 11).
92. U.S. General Accounting Office, *Child Care* (see note 85); American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care, *Caring for Our Children* (see note 89).
93. American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care, *Caring for Our Children* (see note 89), p. 383.
94. National Association for the Education of Young Children, "Licensing and Public Regulation" (see note 10), p. 4.
95. U.S. General Accounting Office, *Child Care* (see note 85).
96. National Association for the Education of Young Children, "Licensing and Public Regulation" (see note 10).
97. National Resource Center for Health and Safety in Child Care, U.S. Department of Health and Human Services, Health Resources and Services Administration, "Individual States' Child Care Licensure Regulations" (<http://nrc.uchsc.edu/STATES/states.htm> [March 22, 2005]).
98. *Ibid.*
99. Carnegie Corporation of New York, *Starting Points: Meeting the Needs of Our Youngest Children* (New York, August 1994).
100. Blank, "Challenges of Child Care" (see note 87).
101. Children's Defense Fund, "Child Care Basics" (see note 11).
102. *Ibid.*; Blank, "Challenges of Child Care" (see note 87).
103. Blank, "Challenges of Child Care" (see note 87).
104. U.S. Department of Labor, Bureau of Labor Statistics, *November 2003 National Occupational Employment and Wage Estimates* (Washington, 2003) (www.bls.gov/news.release/ocwage.t01.htm [August 2, 2005]); C. Howes, M. Whitebook, and D. Phillips, *Worthy Work, Unlivable Wages: The National Child Care Staffing Study, 1988–1997* (Washington: Center for the Child Care Workforce, 1998); S. Helburn and others, *Cost, Quality, and Child Outcomes Study* (Denver, Colo.: University of Colorado, 1995).
105. American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care, *Caring for Our Children* (see note 89); National Association for the Education of Young Children, Division of Early Childhood Council for Exceptional Children, National Board for Professional Teaching Standards, *Guidelines for Preparation of Early Childhood Professionals* (Washington, 1996).

106. American Dietetic Association, "Position of the American Dietetic Association: Nutrition Standards" (see note 40); American Dietetic Association, "Position of the American Dietetic Association: Benchmarks for Nutrition Programs" (see note 40).
107. Dowda and others, "Influences of Preschool Policies" (see note 52).
108. Blank, "Challenges of Child Care" (see note 87).
109. Cubed, *The National Economic Impacts* (see note 7).