Prevalence of overweight and obesity in preschool children

In the United States, excess weight in children is determined using the Body Mass Index (BMI) – a clinically useful weight-for-height measure.\(^1\) BMI at or above the 85th and 95th percentile can be used to identify children who are at risk of overweight and those who are overweight, respectively. Over the last three and a half decades, the prevalence of overweight more than quadrupled among children ages two to five (Figure 1), from 5.0% in the late 1980s to 21.4% in 2008\(^2,3,4\).

Consequences of overweight and obesity in children

The consequences of excess weight in childhood can be categorized as either medical or psychosocial.\(^5\) Medical consequences include both mechanical (i.e., sleep-disordered breathing and orthopedic disorders) and metabolic (i.e., glucose intolerance, dyslipidemia and hypertension). Sleep-disordered breathing refers to repetitive partial or full obstruction of the upper airway. The long-term consequences of these disorders include sustained daytime hypertension and increased cardiovascular and cerebrovascular morbidity and mortality.\(^6\) Orthopedic disorders in children include spinal complications, Blount’s disease, and slipped capital femoral epiphysis.\(^7\) Spinal complications can occur in obese children due to the increased load and resulting stress on the lumbar spine. Blount’s disease is a condition in which the inner part of the shin bone fails to develop normally, resulting in valgus (bowleggedness), which can in turn result in some children experiencing difficulty when walking. Children who are overweight and obese are at risk of altered glucose metabolism and the fatty infiltration of the liver (nonalcoholic fatty liver disease).\(^7\) Longer-term consequences of excess weight in children include the incidence of Type II
diabetes, dyslipidemia (high levels of cholesterol in the blood) and hypertension (or high blood pressure) as adults.

The presence of overweight and obesity during childhood also can have negative impact on the social and emotional aspects of well-being. Over the past 40 years, it has been well documented that obese children and youth are stigmatized, and discriminated against by their peers as well as adults, and that these prejudicial sentiments towards obese children appear to be worsening over time. As a result of these experiences, these vulnerable children can experience low self-esteem, negative body image, and depression. Thus, developing effective interventions to curtail obesity in childhood are vital, since overweight preschoolers (children greater than the 85th percentile (weight for age)) were five times more likely to be overweight by age.

Rationale for Targeting Nutrition and Physical Activity Interventions to Preschool-aged Children in Early Childhood Programs

Early Childcare Usage in the United States

In the United States, 61% of children between the ages of zero and six (12 million of 19 million), regularly receive care from persons other than their parents. Changes in demographics, family structure, gender roles, and economic prosperity over the past 30 years have resulted in more women working outside of the home and a concomitant increase in the need for childcare. As a result, early childcare has become an essential component of the lives of American families:

- The proportion of working mothers with young children increased from 39% in 1975 to 63% in 2007.
- Preschool children as young as six weeks old are enrolled in daycare.
- Almost half (42%) of all young children are cared for full time (35 hours per week or more) in daycare settings.

Taken together, this data underscores the vital role childcare and early childhood education play in the lives of Americans. Consequently, center-based childcare and early education facilities are well positioned to assist in addressing overweight and obesity in young children by providing environments that promote and facilitate healthful eating and physical activity for millions of children.

Early Childhood Developmental Predictors of Obesity and Overweight

Over the lifespan, three main critical periods have been implicated in the development of obesity in children. These include the prenatal period, the period of adiposity rebound, and adolescence. The adiposity rebound period is of most interest when developing strategies to combat early childhood obesity as this second rise in body fatness occurs between the ages of three and seven. Research has shown that increased body fatness in young children (before the age of five) is associated with the onset of obesity during the teen and adult years. In addition, young children who are physically active experience a later adiposity rebound than those who are less active. This means that they are less likely to become overweight, diabetic, or have high blood pressure. This research emphasizes the importance of fostering
healthy behaviors in early childhood.

Head Start: Brief History and Program Overview

The Head Start program is a federal child development program that serves low-income children between ages three and five. This program was developed as a way to enhance the social competence of low-income children with a focus on school readiness that includes health, nutrition, education, social services, and parental engagement components. Funding for this program has grown steadily over the years. In 1965, Head Start had a $96.4 million budget and served 561,000 children through summer programs. In contrast, Head Start’s current appropriation exceeds $7 billion and the program now reaches nearly one million children. Currently, 9% of US children between the ages of three and five in childcare participate in this program that provides vital social, educational and health services to children at high risk of adverse (and often costly) health and nutrition outcomes.

Given that behaviors including healthy eating and physical activity – often learned and supported in early childhood – can persist into adulthood, the childcare environment provides an important opportunity to establish positive habits at an early age. However, there are a wide variety of state policies that govern early childcare and education centers, particularly with regard to nutrition; few states have regulations that address physical activity.

Federal Policies Related to Nutrition in Head Start

Policies impacting nutrition and physical activity in the early education and childcare environments are present at various levels.

- Federal level policies include Head Start Performance Standards and Child and Adult Care Food Program (CACFP) meal pattern requirement;
- State (and Tribal) level policies include state licensing regulations and standards;
- Local level policies include regulations and guidance developed as an interpretation, or in some cases, a strengthening of state level regulations and often reflect local priorities and health and/or education codes. Local policies also can include policies in place within a particular Head Start program or other early child education or childcare setting.

Head Start Performance Standards

Head Start programs operate under detailed regulations and program performance standards. These regulations are mandatory for grantees and delegate agencies to adhere to in order to operate a Head Start program. Careful adherence to these regulations is designed to assure that the Head Start goals and objectives are implemented successfully and that all grantee and delegate agencies maintain the highest possible quality provision of Head Start services.

The objective of the Head Start Performance Standards (HSPS) on nutrition is to enable Head Start services to promote child wellness by providing nutrition services that supplement and support those provided within the homes of program participants and the community at large.

At a minimum, Head Start programs are required to adhere to federal regulations that 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- or full-day programs; 4) staff model healthy eating behaviors and attitudes for children; and 5) facilities provide opportunities for outdoor and indoor active play. A full listing of the nutritional requirements for meals...
provided In Head Start the HSBS is available in Appendix A.22

**Child and Adult Care Food Program**

Preschool-aged children often consume 50 to 100% of their daily calories when in care settings outside the home, which underscores the importance of having a sound nutrition environment available to children.23 Licensed family childcare homes and center-based care programs or those that are approved to provide services may be eligible to receive federal support from the CACFP for the meals and snacks they serve to the children ages 12 years and younger in their programs.24 CACFP is U.S. Department of Agriculture (USDA) program administered at the state level. For each eligible child enrolled in an eligible program, CACFP provides funding reimbursement to childcare centers and family child-care providers for up to either two meals and one snack or one meal and two snacks daily.23

Per USDA regulations and guidelines for CACFP, breakfast meals served to children in childcare settings are required to contain the following three components: (1) fluid milk, (2) vegetable(s) or fruit(s) or full-strength juice (or any combination of these foods), and (3) whole grain or enriched breads or bread alternates (to include whole grain or enriched noodle or pasta products, or whole grain/fortified cold or cooked cereals). Lunch meals for young children are similar to breakfast and include an additional protein component (lean meats, dairy products like cheese or yogurt, protein alternates like eggs, dry beans and peas, nuts/seeds or nut/seed butters). The supper meal components are similar to the lunch meal. The snack meal components include: (1) fluid milk, (2) vegetable(s) or fruit(s) or full-strength juice (or any combination of these foods), (3) bread and bread alternates, and (4) meat and meat alternates; only two out of the four possible components are required to be offered at snack time. A full listing of the minimum components that can be served to young children at breakfast, lunch, supper and snack, depending on their age, is available in Appendix B.25 The CACFP nutrition and meal standards currently are under review by the Institute of Medicine.

Professional organizations like the American Dietetic Association (ADA) also have developed recommendations for the meals served in childcare settings. These guidelines suggest that children participating in full- or part-time care should consume at least two-thirds or one-third of their nutrition needs, respectively.23 The ADA also recommends that care is taken to ensure that the physical environment of the childcare setting communicate and reinforce nutrition concepts taught and modeled by classroom staff through posters and decorations.23 Taken together, the regulations that govern the nutritional environment of Head Start programs are comprehensive in nature and supported by sound science.26, 27, 28, 29

**Other Standards and Guidance**

Caring for Our Children National Health & Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs, a publication issued jointly by the American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care, includes a set of health and safety performance guidelines (or “standards”) with accompanying rationales for childcare providers, parents of children in childcare, health professionals, and state health officials. Topics
covered include health promotion, nutrition and food services, safe-play environments, and program activities for healthy development.

The National Association for the Education of Young Children (NAEYC) is an organization that focuses on the quality of educational and developmental services for all children from birth through age eight. Specific efforts of NAEYC include setting and publicizing standards that promote excellence in early childhood education and professional preparation, and providing professional development opportunities and resources. Part of NAEYC efforts to improve early childhood education includes different systems of accreditation for programs that are committed to meeting national standards of quality. The NAEYC voluntary accreditation system has set professional standards for early childhood education programs and helps families identify high-quality programs for their young children. The standards that address nutrition and physical activity mirror those outlined in Caring for our Children National Health & Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs.

Outcomes Research Evaluating the Impact of Healthy Nutrition Environments

There is limited research evaluating the long-term health and nutrition consequences of the Head Start Program Performance Standards. Although a major component of the program is designed to impact the health of participants, most of the evaluation of the Head Start program to date has focused on cognitive or educational outcomes. The program’s impact on nutrition and health is limited given the varying exposure to or lengths of participation in the program among participants and the varied individual and environmental influences that participants encounter following participation in Head Start. However early quantitative evaluations of the impact of Head Start program participation on nutrition and health status indicated that the program was effective. More recently, Fitzgibbon and colleagues (2002) demonstrated that a foodservice policy in early childcare settings in accordance with the Head Start Performance Standards can be a safe and effective way of increasing the short-term intake of healthy, lower saturated fat meals and snacks in young children.

In 2004, Anderson and colleagues examined the long-term health and behavioral effects of Head Start participation using data from the Panel Study of Income Dynamics (PSID) – a longitudinal study that began in 1968 of a national sample of U.S. households and individuals. From this, the long-term differences in health and behavioral outcomes among adults who participated in Head Start as children and their siblings who did not participate in the program were examined. Anderson and colleagues revealed that Head Start participants were less likely to smoke than those who did not participate in the program. In addition, a ‘spill-over’ effect of the access to health services and health education was identified among households where the eldest children participated in the program. Among African-Americans, the younger siblings of the eldest program participant were more likely to exercise heavily as adults, and among Whites, younger siblings of Head Start participants were less likely to be overweight compared to the oldest sibling who participated in the program. These findings suggest that program participation can have long-term health outcomes for both the participant and members of his/her family, outcomes that support the core mission of the Head Start program.

Status of Policies Regulating Nutrition Environments in Early Childcare Settings

Despite the federal CACFP and Head Start regulations in place, a recent review of the literature implies that there is a need to strengthen the policies that regulate the nutrition environments to which children are exposed in early childcare settings. The findings from three recent reviews of the childcare policies related to menus and to nutrition and physical activity regulations are summarized below:
Kaphingst and Story (2009) reviewed the state childcare policies related to the licensing of early childcare settings (including childcare centers (CCCs), small family childcare homes (SFHs), and large family group childcare homes (LFGHs)); their findings suggest that the practice of nutrition-related regulations differed greatly from state to state. 33

- The most commonly required regulation for childcare providers: Follow the CACFP and other similar meal patterns. (However, less than two-thirds of the states included adherence to CACFP meal patterns as part of state regulation.)

- Only two states required that menus conform to national dietary guidance or that meals provide a specific portion of daily nutrient needs.

- Regulations prohibiting or limiting specified foods of low nutritional value in CCCs, LGFHs and SFHs were available in 12, seven and four states, respectively.

- Regulations related to the operation of vending machines in childcare settings were uncommon; only four states had regulations related to this aspect of the nutrition environment.

State Policies Related to Nutrition and Physical Activity

Model State Childcare Nutrition and Physical Activity Guidelines

In a study directed by Benjamin and colleagues (2004), nutrition, physical activity, early care and education, and policy and regulatory experts developed a set of 10 model state policies each on nutrition and physical activity for childcare facilities (i.e., childcare centers and family childcare homes) using draft policies developed for the Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Out-of Home Child Care Programs document. 34 The model policies focused on a variety of practices within the childcare setting:

<table>
<thead>
<tr>
<th>Healthy Eating</th>
<th>Physical activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sanitation</td>
<td>• Structured and unstructured physical activities</td>
</tr>
<tr>
<td>• Meal service</td>
<td>• Activities that promote sedentary behavior</td>
</tr>
<tr>
<td>• Nutrition education</td>
<td>• Indoor vs. Outdoor activity</td>
</tr>
<tr>
<td>• Staff involvement</td>
<td>• Staff modeling of healthy physical activity</td>
</tr>
<tr>
<td>• Staff modeling of healthy nutrition behaviors</td>
<td>• Play area safety and physical activity education</td>
</tr>
</tbody>
</table>

Following a state-by-state review of existing policies in childcare settings, Benjamin and colleagues (2004) found that most states, on average, addressed less than half of the model practices related to healthy eating for childcare centers and family childcare homes (3.7+1.4 and 2.9+1.6 practices, respectively). For physical activity, states had even fewer policies for childcare centers and family childcare homes (3.5+1.6 and 2.6+1.7 practices, respectively). No state was found to have all 10 model healthy eating and physical activity policies.
activity practices in place at childcare centers or family childcare homes.

Benjamin and colleagues (2009) also conducted a state-by-state evaluation of nutrition policies to examine the presence or absence of key nutrition practices related to childhood obesity. Specifically, each set of state policies was examined to determine if: 1) water was freely available, 2) sugar-sweetened beverages, screen time and foods of low nutrient-density were limited, 3) children were not to be forced to eat, 4) food was not used as a reward, and 5) a supportive environment for breastfeeding and the provision of breast milk is created. The results of this investigation indicated that:

- More than half of the states had policies to ensure that water was freely available to children (80% and 67% for center-based childcare and for family childcare homes, respectively).
- Children were not forced to eat (63% in both childcare centers and family childcare homes).
- Few states had policies that restricted offering sugar-sweetened beverages and foods of low nutrient value (18% and 14% of states have these policies pertaining to childcare centers and family group homes, respectively).
- 20% of childcare centers and 10% of family childcare homes used food as a reward to motivate increased mealtime intake among children.
- About one-fifth (18%) of childcare centers and 6% of family childcare homes had policies expressing support for breastfeeding.

Overall these findings indicate that, in many states, there is a need to develop and enforce the implementation of consistent nutrition-related policies in early childcare facilities.

In a comparison of model childcare menu policies and current state guidance, Benjamin and colleagues (2009) found a number of discrepancies (Figure 3). These authors determined that policies regarding menus differed greatly between the states evaluated.

- Seven states included policies on all five standards for childcare centers, but only three states included them for family childcare homes.
Across states, menu policies were different for childcare centers and family childcare homes. Less than 10 states required professional review of menus in childcare centers and family care homes (eight and three states, respectively).

Figure 3. Five key menu standards from the Caring for Our Children – National Health and Safety Performance Standards: Guidelines for Out of Home Care Programs

1. Menus must be posted or made available to parents.
2. Menus must be dated.
3. Menus must reflect the foods served.
4. Menus must be planned in advance.
5. Menus must be kept on file.

Taken together, these findings suggest that while there are policies in place to regulate the nutrition environment of early childcare and early child education settings, these policies need to be strengthened to ensure that they are in accordance with established federal guidance, available outcomes research, and recommendations from public health professionals.

An Evaluation of Current Policies Regulating Physical Activity Practice in Early Childcare Settings

A recent review of U.S. individual state nutrition and physical activity policies related to childhood obesity for childcare centers (CCCs) and family childcare homes (including large family group homes (LFGHs) and small family homes (SFHs)) revealed that few of the states had specific policies to carry out their programs. Regarding physical activity, most states required large muscle or gross motor and daily outdoor activity time for children in care, and most states had policies addressing daily outdoor activity time. However:

- Only nine states set specific minimum lengths of time (about one hour for most of these states) that children should be outdoors each day.
- 10 states specified that children should be engaged in vigorous play or physical activity; however, this policy was inconsistently applied across the childcare settings investigated (eight states had this requirement for CCCs while fewer states – four and two – had such policies in place for LGFHs and SFHs, respectively).
- Only two states specifically quantified the number of minutes children should be engaged in physical activity in CCCs.

Physical Activity Recommendations for Young Children

While there is some discrepancy among the recommendations for physical activity suggested by authoritative national organizations, in 2009 the National Association for Sport and Physical Education developed a series of age-appropriate guidelines for parents and caregivers of infants, toddlers and preschoolers. Titled ‘Active Start,’ these guidelines include recommendations that preschoolers (ages three to five years):
• Accumulate at least 60 minutes of *structured*, intentionally planned and facilitated physical activity each day;

• Engage in at least 60 minutes and up to several hours of *unstructured* child-initiated physical activity each day, and should not be sedentary for more than 60 minutes at a time, except when sleeping;

• Develop competence in fundamental motor skills that will serve as building blocks for future motor skillfulness and physical activity;

• Access indoor and outdoor areas that meet or exceed recommended safety standards for performing large-muscle activities.

Unfortunately, these guidelines do not specifically address adoption of the recommendations in early childhood education and childcare settings. Thus, there is clearly a need to develop evidence-based standards for physical activity for young children in these settings.

### Figure 4. Nutrition and Physical Activity Self-Assessment for Childcare Components

- Children provided with at least 120 minutes of active playtime each day.
- Teacher-led physical activity provided to children two times per day.
- Outdoor active playtime provided two times per day.
- Outdoor play space includes open, grassy areas and a track/path for wheeled toys.
- Indoor play space available for all activities, including running.
- Wide variety of fixed play equipment provided to accommodate the needs of all children.
- Large variety of portable play equipment available for children to use at the same time.
- Outdoor portable play equipment freely available to all children.
- Television or videos rarely or never shown.
- Children are not seated for periods longer than 30 minutes.
- Visible support for physical activity provided in classrooms and common areas through use of posters, pictures, and displayed books.
- Prominent display of sedentary equipment (e.g., televisions, videos, and electronic games) should be limited.
- Staff should join children in active play.
- Staff should encourage children to be active.
- Active playtime should never be withheld as punishment, and additional active playtime should be given as a reward.
- Physical activity education is provided to children by using a standardized curriculum at least one time per week.
- Physical activity education opportunities should be offered to parents two times per year.
- Physical activity training (not including playground safety) should be provided for staff two times per year.
- Written policies on physical activity should be followed.
An additional resource that can be used to assess current policies and help target efforts to promote physical activity and nutrition is the Nutrition and Physical Activity Self-Assessment for Child Care (NAPSACC) initiative. Developed by researchers at the University of North Carolina (Chapel Hill), this initiative is designed to promote healthy weight in young children in childcare settings (Figure 4) and includes an assessment that covers a variety of aspects of the environments, policies, and practices thought to influence nutrition and physical activity behaviors of children.38

Physical Activity Environments of Head Start Programs

At this time, Head Start program regulations do not specify the amount, frequency, or type of physical activity in which preschool children are to engage. However, the regulations do require linguistic and age-appropriate screening procedures to identify concerns regarding the motor skills of children participating in the program. The regulations also address required conditions in center- and home-based programs necessary to promote the physical development of program participants (Appendix C).22 However, there are no regulations in place to limit the amount of television or computer screen time to which participating children are exposed.39

Recently, advances have been made to improve the physical activity experiences of children in Head Start, including the ‘I Am Moving, I Am Learning’ (IMIL) intervention. Between 2004 and 2006, the Office of Head Start launched the IMIL initiative in West Virginia, Virginia, Maryland, Washington DC, Pennsylvania, and Delaware.40 The goals of this intervention are to: 1) increase the quantity of time spent during the daily routine in moderate to vigorous physical activity (MVPA) to meet national guidelines for physical activity; 2) improve the quality of structured movement experiences intentionally facilitated by teachers and adults; and 3) improve healthy nutrition choices for children every day.

Interim evaluations of the IMIL program suggest that it has resulted in child-specific outcomes as well as parent- and staff-centered outcomes. More recent evaluations of the IMIL program41 indicate that participating programs perceived their efforts to improve the quality of structured movement initiated by adults and teachers as successful but experienced challenges in implementing the program.

About two-thirds (67%) of the programs reported implementing curricular enhancements focused on nutrition goals:

- Changing policies or practices related to the foods served to children (65%);
- Establishing a policy related to foods brought from home (31%); or
- Both (addressing policies on foods served to children and on foods brought from home) (21%).

Most programs rated staff enthusiasm for the IMIL program as very high.

Commonly cited challenges to implementing the IMIL intervention included

- Insufficient management staff time to devote to IMIL (59%);
- Competing programmatic priorities (41%);
- Limited front-line staff time for participation in the IMIL training (33%); and
- Insufficient funds to purchase materials needed for program implementation (35%).

The Head Start, Body Start National Center for Physical Development and Outdoor Play (HSBS) program is a project of the American Alliance for Health, Physical Education, Recreation, and Dance, funded through a grant from the Department of Health and Human Services, Administration for Children and Families, Office of Head Start. The purpose of HSBS is to increase physical activity, outdoor play,
and healthy eating among Head Start and Early Head Start children, families, and staff. HSBS assists Head Start programs in creating healthy learning environments, both inside and outside the classroom, through structured and unstructured physical activity, that lead to the physical, cognitive, social, and emotional development of young children and that reduce obesity and its associated costs. In 2008, funding from the US Department of Health and Human Services was provided for a four-year grant to support the implementation of the three main HSBS program objectives: (a) to inform and assist the Office of Head Start in setting national priorities and developing policies; (b) to provide resources, training and technical assistance to Head Start and Early Head Start centers; and (c) to administer and support grants for construction or improvement of outdoor play spaces at Head Start centers. For evaluation results, see www.HeadStartBodyStart.org.

**Components and Characteristics of Play Spaces in Early Childcare and Educational Settings**

An emerging body of literature suggests that preschool children are not as physically active as was once the case. This is highlighted by the rising trend of overweight and obesity in this population. The policies that govern the allocation of curriculum time to physical activity differ across early childhood education and childcare settings. Emerging research suggests that up to 50% of the variation in physical activity obtained by preschoolers between 9:00 a.m. and 5:00 p.m. can be attributed to the regulations in place at childcare centers. However, there is little information available describing the state of play spaces in early childcare and child education settings. There is research emphasizing the need for providing support to early childcare and educational sites for developing and implementing policies to improve the physical activity environments available to young children. For example, a needs assessment of HSBS grantees revealed that many (38%) perceive the play spaces available at their facilities to be below average or in poor condition.

A recent review of the literature suggests that children in childcare centers with environments that were more supportive of activity achieved higher moderate-to-vigorous levels of physical activity. Bower and colleagues (2009) evaluated the physical activity environment of 20 childcare centers and determined that more supportive physical activity environments offered: opportunities for active play; both portable and fixed play equipment; staff physical activity training and education; and limited opportunities for sedentary activities.

Portable play equipment also was found to be associated with increased physical activity among preschoolers in a recent cross-sectional study of 20 childcare centers by Dowda and colleagues (2009). In this study, higher-quality childcare centers (as assessed by the Early Childhood Environment Rating Scale-Revised), were associated with a lower use of electronic media; larger play spaces and less fixed equipment on the playground were associated with increased physical activity among the children in the sample. Distinguishing between the availability of fixed versus portable play equipment is vital as fixed equipment generally leaves little room for children to play creatively, since there are a finite number of ways to use each aspect of the equipment.
There has been some discussion among researchers regarding the relative contributions of indoor versus outdoor play spaces on physical activity expenditure among young children. Several researchers have suggested that outdoor play can be just as effective as indoor play in advancing the development of young children. Outdoor play is associated with increased physical activity and higher energy expenditure in children. Unfortunately, little research is available on the state of outdoor play spaces at early childcare facilities across the country. However, a recent report by Cosco and colleagues suggests that 10% of licensed childcare centers in North Carolina (n=326) offered minimum accommodations for active play beyond basic sand play areas and climbing structures. Most centers offered a single piece of play equipment and few natural elements. Additional cross-sectional and longitudinal research is needed to characterize the play spaces available at childcare facilities across the nation, to identify areas for improvement and to determine the impact these play spaces have on the energy expenditure of young children.

**Summary: Gaps in the Literature and Recommendations for Future Research**

In the face of escalating rates of childhood obesity and overweight, and their relationship to adverse health outcomes across the lifespan, there is an increased need to identify and curb obesity-promoting behaviors in young children. As many young children spend a part of their day in care outside of the home, there has been increasing emphasis on the early childhood education and childcare environment and its potential to influence the nutrition and physical activity habits children develop at an early age. Areas for future research include:

- The impact of nutrition and physical activity policies in early childcare and educational settings.
- The short- and long-term impact of evidence-based nutrition and physical activity environments on the health and nutrition outcomes of young children.
- Indoor and outdoor play spaces in early childhood education and childcare settings.
- Staff training and professional development needs of early childhood education and childcare providers and other staff.

Taken together, this information is essential for policy makers, researchers, public health advocates, and caregivers alike to build upon current knowledge about the importance of supportive nutrition and physical activity environments for young children and the impact on short- and long-term health and educational achievement.
APPENDIX A
Required Child and Adult Food Program Meal Patterns and Components

Breakfast Meal Pattern

<table>
<thead>
<tr>
<th>Food components</th>
<th>Age 1 and 2</th>
<th>Age 3 through 5</th>
<th>Age 6 through 12</th>
<th>Adult participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk, fluid ....................................................................................</td>
<td>½ cup ²</td>
<td>¾ cup</td>
<td>1 cup</td>
<td>1 cup ²</td>
</tr>
<tr>
<td>Vegetables and Fruits or ....................................................................</td>
<td>¼ cup</td>
<td>½ cup</td>
<td>½ cup</td>
<td>½ cup.</td>
</tr>
<tr>
<td>Full-strength vegetable or fruit juice or an equivalent quantity of any combination of vegetable(s), fruit(s), and juice.</td>
<td>¼ cup</td>
<td>½ cup</td>
<td>½ cup</td>
<td>½ cup.</td>
</tr>
<tr>
<td>Bread and Bread Alternates ³</td>
<td>½ slice</td>
<td>½ slice</td>
<td>1 slice</td>
<td>2 slices (servings).</td>
</tr>
<tr>
<td>Cornbread, biscuits, rolls, muffins, etc. ⁴ or ..................................</td>
<td>½ serving</td>
<td>½ serving</td>
<td>1 serving</td>
<td>2 servings.</td>
</tr>
<tr>
<td>Cold dry cereal ⁶ or ......................................................................</td>
<td>¼ cup or ½ ounce.</td>
<td>¼ cup or ½ ounce.</td>
<td>¼ cup or ½ ounce.</td>
<td>1½ cup or 2 ounce.</td>
</tr>
<tr>
<td>Cooked cereal or ..........................................................................</td>
<td>¼ cup</td>
<td>¼ cup</td>
<td>½ cup</td>
<td>1 cup.</td>
</tr>
<tr>
<td>Cooked pasta or noodle products or ..............................................</td>
<td>¼ cup</td>
<td>¼ cup</td>
<td>½ cup</td>
<td>1 cup.</td>
</tr>
<tr>
<td>Cooked cereal grains or an equivalent quantity of any combination of bread/bread alternate.</td>
<td>¼ cup</td>
<td>¼ cup</td>
<td>½ cup</td>
<td>1 cup.</td>
</tr>
</tbody>
</table>

¹ Children age 12 and up may be served adult size portions based on the greater food needs of older boys and girls, but shall be served not less than the minimum quantities specified in this section for children age 6 up to 12.

² For purposes of the requirements outlined in this subsection, a cup means a standard measuring cup.

³ Bread, pasta or noodle products, and cereal grains, shall be whole grain or enriched; cornbread, biscuits, rolls, muffins, etc., shall be made with whole grain or enriched meal or flour; cereal shall be whole grain or enriched or fortified.

⁴ Serving sizes and equivalents to be published in guidance materials by FNS.

⁵ Either volume (cup) or weight (ounces) whichever is less.
### APPENDIX A

**Required Child and Adult Food Program Meal Patterns and Components**

#### Lunch Meal Pattern

<table>
<thead>
<tr>
<th>Food components</th>
<th>Age 1 and 2</th>
<th>Age 3 through 5</th>
<th>Age 6 through 12</th>
<th>Adult participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk, fluid</td>
<td>½ cup²</td>
<td>¾ cup</td>
<td>1 cup</td>
<td>1 cup².</td>
</tr>
<tr>
<td>Vegetables and Fruits³</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables(s) and/or fruit(s)</td>
<td>¼ cup total</td>
<td>½ cup total</td>
<td>¾ cup total</td>
<td>1 cup total.</td>
</tr>
<tr>
<td>Bread or Bread Alternates⁴</td>
<td>½ slice</td>
<td>½ slice</td>
<td>1 slice</td>
<td>2 slices (servings).</td>
</tr>
<tr>
<td>Combread, biscuits, rolls, muffins, etc.⁵ or ...</td>
<td>½ serving</td>
<td>½ serving</td>
<td>1 serving</td>
<td>2 servings.</td>
</tr>
<tr>
<td>Cooked pasta or noodle products or ...</td>
<td>¼ serving</td>
<td>¼ serving</td>
<td>½ serving</td>
<td>1 cup.</td>
</tr>
<tr>
<td>Cooked cereal grains or an equivalent quantity of any combination of bread/bread alternate.</td>
<td>¼ cup</td>
<td>¼ cup</td>
<td>½ cup</td>
<td>1 cup.</td>
</tr>
<tr>
<td>Meat and Meat Alternates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lean meat or poultry or fish⁶ or ...</td>
<td>1 ounce</td>
<td>1½ ounces</td>
<td>2 ounces</td>
<td>2 ounces.</td>
</tr>
<tr>
<td>Alternate protein products⁷ or ...</td>
<td>1 ounce</td>
<td>1½ ounces</td>
<td>2 ounces</td>
<td>2 ounces.</td>
</tr>
<tr>
<td>Cheese or ...</td>
<td>1 ounce</td>
<td>1½ ounces</td>
<td>2 ounces</td>
<td>2 ounces.</td>
</tr>
<tr>
<td>Egg (large) or ...</td>
<td>¼ cup</td>
<td>¾ cup</td>
<td>½ cup</td>
<td>1 cup.</td>
</tr>
<tr>
<td>Cooked dry beans or peas or ...</td>
<td>2 tablespoons</td>
<td>3 tablespoons</td>
<td>4 tablespoons</td>
<td>4 tablespoons.</td>
</tr>
<tr>
<td>Peanut butter or soy nut butter or other nut or seed butters or ...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanuts or soy nuts or tree nuts or seeds⁸ or ...</td>
<td>½ ounce⁹=50%</td>
<td>¾ ounce⁹=50%</td>
<td>1 ounce⁹=50%</td>
<td>1 ounce⁹=50%</td>
</tr>
<tr>
<td>Yogurt, plain or flavored, unsweetened or sweetened or an equivalent quantity of any combination of the above meat/meat alternates.</td>
<td>4 ounces or ½ cup.</td>
<td>6 ounces or ¾ cup.</td>
<td>8 ounces or 1 cup.</td>
<td>8 ounces or 1 cup.</td>
</tr>
</tbody>
</table>

¹ Children age 12 and up may be served adult size portions based on the greater food needs of older boys and girls, but shall be served not less than the minimum quantities specified in this section for children age 6 up to 12.

² Serve 2 or more kinds of vegetable(s) and/or fruit(s). Full-strength vegetable or fruit juice may be counted to meet not more than one-half of this requirement.

³ Bread, pasta or noodle products, and cereal grains, shall be whole grain or enriched; combread, biscuits, rolls, muffins, etc., shall be made with whole grain or enriched meal or flour.

⁴ Edible portion as served.

⁵ Must meet the requirements in appendix A of this part.

⁶ Tree nuts and seeds that may be used as meat alternates are listed in program guidance.

⁷ No more than 50% of the requirement shall be met with nuts or seeds. Nuts or seeds shall be combined with another meat/meat alternate to fulfill the requirement. For purposes of determining combinations, 1 ounce of nuts or seeds is equal to 1 ounce of cooked lean meat, poultry, or fish.
## APPENDIX A
### Required Child and Adult Food Program Meal Patterns and Components

#### Supper Meal Pattern

<table>
<thead>
<tr>
<th>Food components</th>
<th>Age 1 and 2</th>
<th>Age 3 through 5</th>
<th>Age 6 through 12</th>
<th>Adult participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk, fluid</td>
<td>½ cup²</td>
<td>¾ cup²</td>
<td>1 cup</td>
<td>None.</td>
</tr>
<tr>
<td>Vegetables(s) and/or fruit(s)</td>
<td>¼ cup total</td>
<td>½ cup total</td>
<td>¾ cup total</td>
<td>1 cup total.</td>
</tr>
<tr>
<td>Bread and Bread Alternates.</td>
<td>½ slice</td>
<td>½ slice</td>
<td>1 slice</td>
<td>2 slices (servings).⁵</td>
</tr>
<tr>
<td>Combread, biscuits, rolls, muffins, etc.⁵ or ..............</td>
<td>½ serving</td>
<td>½ serving</td>
<td>1 serving</td>
<td>2 servings.</td>
</tr>
<tr>
<td>Cooked cereal grains or an equivalent quantity of any combination of bread/bread alternate.</td>
<td>¼ cup</td>
<td>¼ cup</td>
<td>½ cup</td>
<td>1 cup.</td>
</tr>
<tr>
<td><strong>Meat and Meat Alternates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lean meat or poultry or fish⁶ or .........................</td>
<td>1 ounce</td>
<td>1½ ounces</td>
<td>2 ounces</td>
<td>2 ounces.</td>
</tr>
<tr>
<td>Alternate protein products⁷ or ............................</td>
<td>1 ounce</td>
<td>1½ ounces</td>
<td>2 ounces</td>
<td>2 ounces.</td>
</tr>
<tr>
<td>Cheese or</td>
<td>1 ounce</td>
<td>1½ ounces</td>
<td>2 ounces</td>
<td>2 ounces.</td>
</tr>
<tr>
<td>Egg (large) or</td>
<td>½</td>
<td>¾</td>
<td>1</td>
<td>1.</td>
</tr>
<tr>
<td>Cooked dry beans or peas or</td>
<td>¼ cup</td>
<td>¾ cup</td>
<td>½ cup</td>
<td>½ cup.</td>
</tr>
<tr>
<td>Peanut butter or soy nut butter or other nut or seed butters or</td>
<td>2 tablespoons</td>
<td>3 tablespoons</td>
<td>4 tablespoons</td>
<td>4 tablespoons.</td>
</tr>
<tr>
<td>Peanuts or soy nuts or tree nuts or seeds⁸ or .............</td>
<td>½ ounce⁹=50%</td>
<td>¾ ounce⁹=50%</td>
<td>1 ounce⁹=50%</td>
<td>1 ounce⁹=50%.</td>
</tr>
<tr>
<td>Yogurt, plain or flavored, unsweetened or</td>
<td>4 ounces or</td>
<td>6 ounces or</td>
<td>8 ounces or 1</td>
<td>8 ounces or 1</td>
</tr>
<tr>
<td>sweetened or an equivalent quantity of any combination of the above meat/meat alternates.</td>
<td>½ cup.</td>
<td>⁹⁴ cup.</td>
<td>¹ cup.</td>
<td>¹ cup.</td>
</tr>
</tbody>
</table>

¹ Children age 12 and up may be served adult size portions based on the greater food needs of older boys and girls, but shall be served not less than the minimum quantities specified in this section for children age 6 up to 12.

² For purposes of the requirements outlined in this subsection, a cup means a standard measuring cup.

³ Serve 2 or more kinds of vegetable(s) and/or fruit(s). Full-strength vegetable or fruit juice may be counted to meet not more than one-half of this requirement.

⁴ Bread, pasta or noodle products, and cereal grains, shall be whole grain or enriched; combread, biscuits, rolls, muffins, etc., shall be made with whole grain or enriched meal or flour.

⁵ Serving sizes and equivalents to be published in guidance materials by FNS.

⁶ Edible portion as served.

⁷ Must meet the requirements in appendix A of this part.

⁸ Tree nuts and seeds that may be used as meat alternates are listed in program guidance.

⁹ No more than 50% of the requirement shall be met with nuts or seeds. Nuts or seeds shall be combined with another meat/meat alternate to fulfill the requirement. For purpose of determining combinations, 1 ounce of nuts or seeds is equal to 1 ounce of cooked lean meat, poultry, or fish.
### Snack Meal Pattern

<table>
<thead>
<tr>
<th>Food components</th>
<th>Age 1 and 2</th>
<th>Age 3 through 5</th>
<th>Age 6 through 12 (^1)</th>
<th>Adult participants (^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MILK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk, fluid</td>
<td>½ cup (^2)</td>
<td>½ cup</td>
<td>1 cup</td>
<td>1 cup</td>
</tr>
<tr>
<td><strong>VEGETABLES AND FRUIT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetable(s) and/or fruit(s) or Full-strength vegetable or fruit juice or an equivalent quantity of any combination of vegetable(s), fruit(s), and juice.</td>
<td>½ cup</td>
<td>½ cup</td>
<td>¾ cup</td>
<td>½ cup</td>
</tr>
<tr>
<td><strong>BREAD AND BREAD ALTERNATES</strong> (^3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bread or</td>
<td>½ slice</td>
<td>½ slice</td>
<td>1 slice</td>
<td>1 slice (serving)</td>
</tr>
<tr>
<td>Cornbread, biscuits, rolls, muffins, etc. (^4) or Cold dry cereal (^5)</td>
<td>½ serving</td>
<td>½ serving</td>
<td>1 serving</td>
<td>1 serving</td>
</tr>
<tr>
<td>Cooked pasta or noodle products or Cooked cereal or grains or an equivalent quantity of any combination of bread/bread alternates.</td>
<td>½ cup</td>
<td>½ cup</td>
<td>½ cup</td>
<td>½ cup</td>
</tr>
<tr>
<td><strong>MEAT AND MEAT ALTERNATES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lean meat or poultry or fish (^6) or Alternate protein products (^7) or Cheese or Egg (large) (^8) or Cooked dry beans or peas or Peanut butter or soy/nut butter or other nut or seed butters or.</td>
<td>½ ounce</td>
<td>½ ounce</td>
<td>1 ounce</td>
<td>1 ounce</td>
</tr>
<tr>
<td>Yogurt, plain or flavored, unsweetened or sweetened, or an equivalent quantity of any combination of meat/meat alternates.</td>
<td>2 ounces or ¼ cup.</td>
<td>2 ounces or ¼ cup.</td>
<td>4 ounces or ½ cup.</td>
<td>4 ounces or ½ cup.</td>
</tr>
</tbody>
</table>

\(^1\) Children age 12 and up may be served adult size portions based on the greater food needs of older boys and girls, but shall be served not less than the minimum quantities specified in this section for children age 6 up to 12.

\(^2\) For purposes of the requirements outlined in this subsection, a cup means a standard measuring cup.

\(^3\) Bread, pasta or noodle products, and cereal grains shall be whole-grain or enriched; cornbread, biscuits, rolls, muffins, etc. shall be made with whole-grain or enriched meal or flour; cereal shall be whole-grain or enriched or fortified.

\(^4\) Serving size and equivalents to be published in guidance materials by FNS.

\(^5\) Either volume (cup) or weight (ounce), whichever is less.

\(^6\) Edible portion as served.

\(^7\) Must meet the requirements in Appendix A of this part.

\(^8\) One-half egg meets the required minimum amount (one ounce or less) of meat alternates.

\(^9\) Tree nuts and seeds that may be used as meat alternates are listed in program guidance.
### APPENDIX B: Head Start Performance Standards (Nutrition)

<table>
<thead>
<tr>
<th>Policy document</th>
<th>Section</th>
<th>Components of policy</th>
</tr>
</thead>
</table>
| PART 1304       | Staff and families must work together to identify each child’s nutritional needs, as follows: | - Account for relevant nutrition-related assessment data;  
- Account for information about family eating patterns and feeding requirements;  
- Share feeding schedules and amounts and types of food provided, meal patterns, food intolerances and preferences, voiding patterns, and observations related to developmental changes in feeding and nutrition with parents;  
- Account for major community nutritional issues. |
|                 | Scope of nutritional services provided: | - Design and implement a nutrition program that meets the nutritional needs and feeding requirements of each child;  
- Serve a variety of foods which consider cultural and ethnic preferences and which broaden the child’s food experience;  
- Use funds from USDA Food and Consumer Services Child Nutrition Programs as the primary source of payment for meal services; |
## APPENDIX B: Head Start Performance Standards (Nutrition - continued)

<table>
<thead>
<tr>
<th>Policy document</th>
<th>Section</th>
<th>Components of policy</th>
</tr>
</thead>
</table>
| PART 1304       | Scope of nutritional services provided (continued): | • Serve meals that meet a percentage (1/3 – 1/2) of daily nutrient requirements;  
• Serve a nourishing breakfast to all children in morning center-based settings;  
• Each infant and toddler in center-based settings must receive food appropriate to his or her nutritional needs, developmental readiness, and feeding skills;  
• For three- to five-year-olds in center-based settings, the quantities and kinds of food served must conform to recommended serving sizes and minimum standards for meal patterns recommended;  
• For three- to five-year-olds in center-based settings or other Head Start group experiences, foods served must be high in nutrients and low in fat, sugar, and salt;  
• Meal and snack periods in center-based settings must be appropriately scheduled and adjusted, where necessary, to ensure that individual needs are met.  
• Provide appropriate snacks and meals to each child during group socialization activities (home-based programs).  
• Staff must promote effective dental hygiene among children in conjunction with meals.  
• Parents and appropriate community agencies must be involved in planning, implementing, and evaluating the agencies’ nutritional services. |
### APPENDIX B: Head Start Performance Standards (Nutrition - continued)

<table>
<thead>
<tr>
<th>Policy document</th>
<th>Section</th>
<th>Components of policy</th>
</tr>
</thead>
</table>
| PART 1304       | Meal services in center-based settings contribute to the development and socialization of enrolled children by providing that: | • A variety of food is served which broadens each child’s food experiences;  
• Food is not used as punishment or reward, and that each child is encouraged, but not forced, to eat or taste his or her food;  
• Sufficient time is allowed for each child to eat;  
• All toddlers and preschool children and assigned classroom staff, including volunteers, eat together family style and share the same menu to the extent possible;  
• Infants are held while being fed and are not laid down to sleep with a bottle;  
• Medically based diets or other dietary requirements are accommodated; and  
• As developmentally appropriate, opportunity is provided for the involvement of children in food-related activities. |
| PART 1304       | Food safety and sanitation. | • Grantee and delegate agencies must post evidence of compliance with all applicable Federal, State, Tribal, and local food safety and sanitation laws.  
• For programs serving infants and toddlers, facilities must be available for the proper storage and handling of breast milk and formula. |
## APPENDIX C: Head Start Performance Standards (Physical Activity)

<table>
<thead>
<tr>
<th>Policy document</th>
<th>Section</th>
<th>Components of policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 CFR 1304.20</td>
<td>Screening for developmental, sensory, and behavioral concerns.</td>
<td>In collaboration with each child’s parent, and within 45 calendar days of the child’s entry into the program, grantees and delegate agencies must perform or obtain linguistically and age-appropriate screening procedures to identify concerns regarding a child’s developmental, sensory (visual and auditory), behavioral, motor, language, social, cognitive, perceptual, and emotional skills.</td>
</tr>
<tr>
<td>45 CFR 1304.21</td>
<td>Promotion of child’s physical development in center-based settings, by:</td>
<td>Promoting of child’s physical development in center-based settings through parents by:</td>
</tr>
<tr>
<td>Education and early childhood development</td>
<td>• Providing sufficient time, indoor and outdoor space, equipment, materials, and adult guidance for active play and movement that support the development of gross motor skills;</td>
<td>• Appreciating the importance of physical development;</td>
</tr>
<tr>
<td></td>
<td>• Providing appropriate time, space, equipment, materials, and adult guidance for the development of fine motor skills according to each child’s developmental level; and</td>
<td>• Providing opportunities for children’s outdoor and indoor active play; and</td>
</tr>
<tr>
<td></td>
<td>• Providing an appropriate environment and adult guidance for the participation of children with special needs.</td>
<td>• Guiding children in the safe use of equipment and materials.</td>
</tr>
</tbody>
</table>
NOTES