

Early Care and Education Policies and Programs to Support Healthy Eating and Physical Activity: Best Practices and Changes Over Time

Research Review: 2010-2016

Healthy Eating Research

Building evidence to prevent childhood obesity

Research Review, December 2017

Abstract

In 2011, a Healthy Eating Research/Active Living Research (HER/ALR) Research Synthesis: *Preventing Obesity Among Preschool Children: How Can Child-care Settings Promote Healthy Eating and Physical Activity*¹ primarily reviewed the research surrounding opportunities to promote a healthy diet and regular physical activity among preschool children. It also examined the outcomes of research interventions designed to prevent obesity in early care and education (ECE) settings.

However, over the last six years, efforts to strengthen policies, systems, and environments to promote health and prevent obesity have become more robust and widespread. With improvements to federal and state regulations, state licensing requirements and quality initiatives, and an increased focus on comprehensive local wellness policies, many child-care settings are strengthening their environments through practices and policies to promote health.

Furthermore, while rates of early childhood overweight and obesity have been decreasing over the past several years, they are still high, and significant health disparities remain across ethnic and income groups. The early childhood years are critical to the prevention of obesity and the development of healthy dietary and physical activity habits, and the role of the child-care setting is becoming increasingly important in fostering these healthy behaviors in young children.

Therefore, an updated research synthesis was needed. What follows is a comprehensive overview of changes to obesity-prevention policies and evidence-based guidance that have occurred over the past five years and a review of the impact that these policy, systems, and environmental interventions have had in the ECE setting on promoting a healthy diet, adequate physical activity, and reduced screen time.

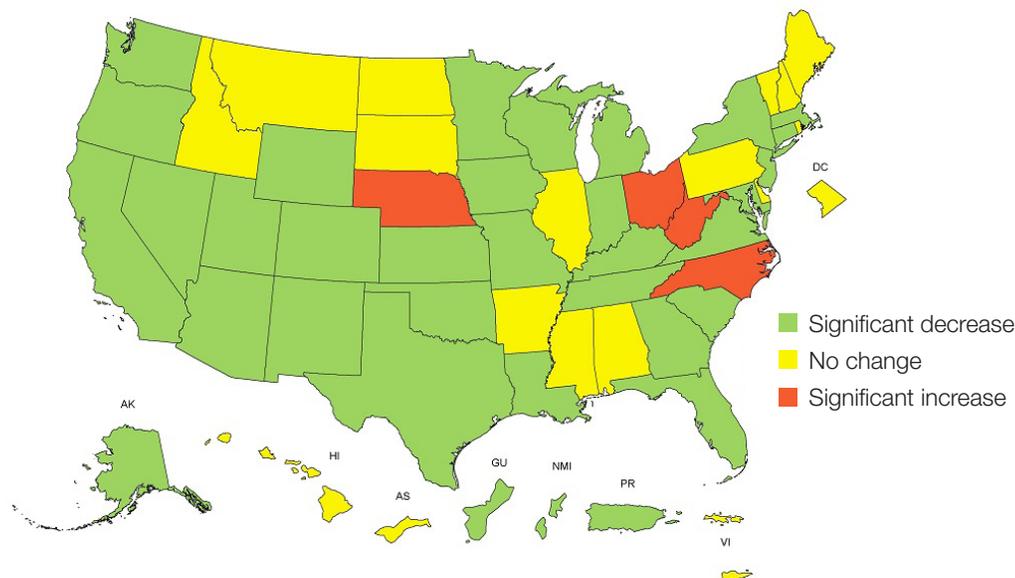
Introduction

Childhood overweight and obesity affect 22.8 percent of U.S. preschoolers and 8.1 percent of infants and toddlers.² Early childhood has been identified as a critical period for the prevention of obesity and the development of protective behaviors such as healthy dietary and physical activity patterns.^{3,4} Addressing the association between child-care attendance and risk of obesity in children⁵⁻⁷ is of critical importance, especially because an estimated 12 million infants and young children (0-5 years) in the United States spend time in some type of ECE setting (including Head Start, Pre-K, child-care centers and family child-care homes) each day,⁸ with the most common form of non-parental child-care provided by family, friends, and neighbors.⁹



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Change in Obesity Prevalence among WIC Participants Aged 2–4 Years, by WIC State Agency— United States, 2010–2014



While rates of early childhood overweight and obesity are still high, they are beginning to decline in some segments of the population.^{5,10} Nationally, obesity decreased significantly among 2- to 5-year-old children between 2003-2004 and 2013-2014,² and among low-income preschool-aged children between 2008 and 2011.¹⁰ Most recently, data from the Centers for Disease Control and Prevention (CDC) provide evidence of further improvements, with obesity rates among low-income 2- to 4-year-old participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), going from 15.9 percent in 2010 to 14.5 percent in 2014.¹¹ Similar declines were observed among all five major racial/ethnic groups and among children served by 34 of the 56 WIC State Agencies between 2010 and 2014.¹¹

Despite these improvements, significant health disparities remain and improvements have not been seen equally across all groups.^{12,13} Black and Latino youths have substantially higher rates of overweight and obesity than do their White and Asian peers and this disparity exists among both boys and girls throughout childhood.¹⁴ Among preschoolers (2-5 years) specifically, Latinos are three times as likely and Blacks twice as likely to be obese as Whites.¹⁴

Over the last six years, efforts to strengthen policies, systems, and environments to promote health and prevent obesity have become more robust and widespread.¹⁴ During this time, the federal policy landscape has changed significantly, with legislative and regulatory updates to nearly every federal policy and program that touches child-care programs. Additionally, changes to strengthen state regulations, state licensing requirements and quality initiatives, and local wellness policies are all impacting practices in child-care settings.¹⁵⁻¹⁸ However,

the impact that these changes have had on child health is not known. The goal of the current research review is to provide the most up-to-date information on the impact of these changes in policies, systems, and environments aimed at promoting a healthy diet, increasing physical activity, and reducing screen time in young children in the ECE setting.

Methodology

To first identify relevant articles, the research team reviewed 11 systematic research review articles (Appendix A) published between 2010 and 2016 on obesity prevention interventions and outcomes in U.S.-based ECE settings. Any individual peer-reviewed articles cited in these reviews that fit the inclusion criteria were kept for more detailed review. Articles were included if they were published between 2010 and 2016 and were original, peer-reviewed research articles conducted with U.S.-based samples in a child-care setting. Additional PubMed and Google Scholar searches were then conducted using combinations of the keywords “child-care” or “early care and education” with “obesity policy,” “nutrition,” “nutrition education,” “physical activity,” and “built environment.” Researchers also conducted a forward search for articles that cited the original HER/ALR 2011 research review and met the inclusion criteria, yet were not identified through other means. In all, 89 articles were identified and reviewed; of those, 79 met the inclusion criteria. Table 1 summarizes key details of the 42 intervention studies identified in this sample, including intervention design, measures, and results that are included in this review. Additional observational studies, program evaluations, and cross-sectional studies in the sample are discussed within the review.

For the policy analysis, researchers reviewed federal legislative activities and federal register notices for programs in ECE settings that address nutrition, physical activity, screen time, or other health-related areas. Researchers also analyzed policy recommendations including those from the American Academy of Pediatrics (AAP) and the National Academy of Medicine (NAM; formerly the Institute of Medicine); state regulatory analyses, including those from the National Resource Center for Health and Safety in Child Care and Early Education (NRC), the Centers for Disease Control and Prevention (CDC), and the Public Health Law Center; a health impact analysis from the Pew Charitable Trusts; and analyses of state quality rating improvement systems (QRIS) from the Nemours Foundation and CDC. This helped to inform the “Key Changes to Policies and Evidence-based Guidance Impacting the ECE Setting” section below. Peer-reviewed, published literature on the impact of these policies is analyzed in the “Key Research Results” section.

Key Changes to Policies & Evidence-Based Guidance Designed to Impact the ECE Setting

ECE programs, primarily governed through federal and state laws, policies, regulations, and guidelines, are increasingly required to promote healthy eating and physical activity to support the development of lifelong healthy behaviors. The following sections highlight key changes over the last six years in ECE-related programs addressing healthy eating, physical activity, and screen time policies and practices.

Child and Adult Care Food Program

The U.S. Department of Agriculture (USDA) administers the federal Child and Adult Care Food Program (CACFP) through grants to states. CACFP provides meals and snacks to more than 4.2 million children a day in a variety of child-care and after-school settings.¹⁹ Most licensed ECE facilities, including centers and family-homes, are eligible to participate if they meet income guidelines.²⁰ In order to receive federal funding, participating sites must follow standards, including nutrition guidelines and portion sizes for CACFP meals, set by USDA. USDA also provides nutrition education resources and offers training to help ECE providers comply with these standards.

In 2016, USDA updated the CACFP meal patterns²¹ based on the 2015 Dietary Guidelines for Americans and scientific recommendations from the NAM, aligning them with WIC and other child nutrition programs (Figure 1). These updates represent the most significant changes to the program in over 40 years and help address earlier findings that show that menus under the earlier CACFP criteria may have been too high in saturated fat and sodium content and too low in iron and fiber.²²

In addition to the updated meal patterns, USDA also outlines a number of best practices to further improve the nutrition quality of meals and snacks provided through the CACFP program. These best practices are not required; rather they build on the meal patterns and provide options for participating sites to further improve the nutritional quality of the meals they serve. Best practices include strategies to promote breastfeeding,

Figure 1: Snapshot of CACFP Meal Pattern Updates

Previous Meal Pattern	Updated Meal Pattern (Required as of Oct. 1, 2017)
Fruits OR vegetables served at lunch meals	Both fruits and vegetables (or two different vegetables) served at lunch meals
Juice may be served and counted as a fruit component of the meal with no limits	Juice may be served and counted as a fruit component of the meal, but is limited to once per day
Whole grains or enriched grains allowed with no minimum requirement for whole grains	One serving of whole grain-rich grains must be served each day
Grain-based desserts are allowed at meals and snacks as a reimbursable grain component	Grain-based desserts, such as cookies, cakes, and pies, are no longer reimbursable as a grain component
No sugar limits or restrictions on any foods or meal components	Meal patterns limit added sugar by requiring unflavored milk only for children ages 0-5 and by limiting sugar in ready-to-eat cereals and yogurt
Breast milk provided by bottle is reimbursable	Breast milk provided by bottle and direct breastfeeding onsite is reimbursable
Fruit juice, but not whole fruits or vegetables, is reimbursable under the snack meal pattern for infants 6-11 months old	Fruits and/or vegetables must be served as snacks for infants 6-11 months old; juice is no longer reimbursable for this age group

such as offering a quiet, private area for mothers to breastfeed, and increased variety and quantities of fruits and vegetables, including by offering minimum servings of all vegetable subgroups each week and offering a fruit or vegetable at all snacks. Best practices also encourage providers to make other improvements such as offering two whole grain servings per day, limiting the service of processed meats to no more than once per week and severing unflavored milk to all participants.²¹

Child Care and Development Block Grant

In 2014, Congress reauthorized the Child Care and Development Block Grant (CCDBG) Act through 2020.²³ CCDBG provides funding for child-care centers to assist over 1.4 million children each month throughout the United States, U.S. Territories, and Tribal communities, by providing low-income families who are working or participating in education or training activities with help paying for child-care.²⁴ The law has several new provisions specifically related to nutrition and physical activity, including requiring CCDBG-participating states to disseminate information to families about other assistance programs (i.e., WIC, SNAP) that are available to them; ensuring that eligible providers are enrolled in CACFP; and supporting efforts to develop high-quality health, mental health, nutrition, physical activity, and development program standards (i.e., adopting high-quality standards within licensing requirements or encouraging standards through Quality Rating and Improvement Systems). States and territories are expected to be fully compliant by October 1, 2018.

Head Start/Early Head Start Standards

The Head Start and Early Head Start programs promote school readiness and support the health of pregnant women, infants, toddlers, and children ages birth to five from low-income families. Together, the two programs serve nearly one million children and families. Head Start's Program Performance Standards²⁵ were updated in 2016 and reflect the first comprehensive revision since their original publication in 1975.

The 2016 revisions include requirements that nutrition services must be culturally and developmentally appropriate, that child-care programs make safe drinking water freely available to children throughout the day, that programs integrate intentional movement and physical activity into curricular activities and daily routines, and that physical activity is not used as a reward or punishment for young kids.²⁶ The goal of these changes is to ensure that programs actively engage in obesity prevention in the classroom as well as through the family partnership process by providing guidance, resources, education, and measurement against the performance standards.

State Child Care Licensing Standards

Through licensing regulation, states have the opportunity to implement comprehensive obesity prevention measures addressing healthy eating, active play, and screen time in child-care settings. However, existing requirements vary widely and most states lack strong regulations relating to the promotion of healthy eating and physical activity.²⁷ A 2016 *Public Health Law Center* analysis of child-care licensing regulations in all 50 states and the District of Columbia found 18 states where regulations would require child-care centers, even those not participating in CACFP, to implement the current CACFP meal patterns and only 11 states where regulations of family child-care homes would require the same.²⁷

Despite variation among states, progress is promising. Since 2010, the NRC's *Achieving a State of Healthy Weight* report has documented how closely each state's ECE licensing regulations reflect the best evidence, expertise, and experience on quality health and safety practices and policies that should be followed in centers, large family child-care homes, and small family child-care homes. The report evaluates each policy against 47 high impact obesity prevention standards. High impact standards include practices such as requiring space for active play, limiting screen time to 30 minutes per week, making water available, limiting serving sizes of juice, offering a variety of vegetables and whole fruits, and providing appropriate serving sizes at meals. According to the most recent report, from 2011-2014, 25 states made licensing updates and all included obesity prevention.^{15,28} However, the most prevention standards any state fully met in 2014 was 15 out of 47 in the state of Mississippi.²⁸

Quality Rating and Improvement Standards

Quality Rating and Improvement Systems (QRIS) were developed as a systematic approach to improve the quality of ECE programs, increase parent understanding of and support for quality care, and supplement regulatory requirements. Through QRIS, states define what constitutes a higher quality of care based on designated criteria using a rating system. QRIS is often linked to enhanced training, professional development, provider education and training qualifications, accreditation, and child-care subsidy reimbursement rates.^{29,30}

Many QRIS programs now require standards for nutrition, infant feeding, physical activity, or screen time, and some also require assessments of health and wellness policies and practices. Of the 39 states with quality rating systems, 29 have included obesity prevention in their state standards.²⁸ Forty-two states offered online professional development for ECE providers covering obesity prevention topics.²⁸

Evidenced-Based Guidance

Currently, only a few of the federal ECE programs include policies on physical activity or screen time. Thus, the following two sections outline national recommendations and evidence-based guidelines published in the last five years related to physical activity and screen time in early care and education.

Physical Activity

Movement and active play facilitate the motor, social, and cognitive development needed for healthy growth and well-being of infants, toddlers, and preschoolers in child-care settings. Recommended standards have been published by NAM (formerly the Institute of Medicine), Caring for our Children: National Health and Safety Performance Standards, Let’s Move Child Care, and Shape America (Figure 2). Each set of recommendations aims to improve the quality and quantity of physical activity, however the details of the recommendations are inconsistent (e.g., such as the amount of time toddlers and preschoolers should be engaged in physical activity).

In 2011, The Early Childhood Prevention Policies committee, convened by NAM, recommended child-care providers offer opportunities for toddlers and preschoolers to engage

in light, moderate, and vigorous physical activity for at least 15 minutes per hour while children are in care.³¹ This corresponds to approximately 3 hours of physical activity over a period of 12 waking hours. Authoritative organizations in Canada, the UK, and Australia have issued similar guidance in the last five years.³²⁻³⁴

Although multiple organizations and scientific bodies view physical activity of young children as important, the complexity and lack of a consistent set of standards in the United States may make it difficult for child-care providers and researchers to develop and implement interventions to increase physical activity.

Screen Time

The AAP recently updated its at-home screen time recommendations stating that children ages 2-5 should engage with high-quality media content, under caregiver supervision, for no more than one hour per day. Furthermore, television and other media should be avoided for infants and children under 18 months of age (unless it involves supervised video chatting).³⁸ Although these recommendations target parents, they could apply to out-of-home child-care settings as well. Additionally, the NAM’s Early Childhood Obesity Prevention Policies³¹ recommend that “adults working with children should

Figure 2: Physical Activity Recommendations

	Infants	Toddlers and Preschoolers
SHAPE America (2009)³⁵	Caregivers should place infants in settings that encourage and stimulate movement experiences and active play for short periods of time several times a day.	Each day toddlers and preschoolers should: <ul style="list-style-type: none"> ■ accumulate at least 30-60 minutes of structured physical activity; ■ engage in at least 60 minutes—and up to several hours—of unstructured physical activity; and ■ should not be sedentary for more than 60 minutes at a time, except when sleeping.
National Academy of Medicine (formerly the Institute of Medicine) (2011)³¹	Infants should engage with adults in daily opportunities to move freely, exploring their indoor and outdoor environments; infants less than six months of age should engage in daily tummy time.	Provide opportunities for light, moderate, and vigorous physical activity for at least 15 minutes per hour while children are in care.
Caring for Our Children (2013)³⁶	Infants should engage in supervised tummy time daily and participate in a mix of indoor and outdoor experiences that safely support the infant’s developmental milestones.	Toddlers should engage in 60-90 minutes per eight-hour day and preschoolers should engage in 90-120 minutes per eight-hour day of moderate to vigorous physical activity.
Let’s Move Child Care (2014)³⁷	Infants should engage in daily, supervised tummy time (time in the prone position) daily and participate in a mix of indoor and outdoor experiences that safely support the infant’s developmental milestones.	Toddlers should engage in 60 minutes of active play (indoor/outdoor), with a combination of free play and teacher-led; preschoolers should engage in double that at 120 minutes.

limit screen time, including television, cell phone, or digital media, to less than two hours per day for children aged 2–5.⁷ Suggested policy actions for child-care centers indicate that child-care settings should limit screen time for preschoolers (aged 2–5) to less than 30 minutes per day for children in half-day programs or less than one hour per day for those in full-day programs. Similarly, *Caring for our Children: National Health and Safety Performance Standards*³⁷ provides specific best practices for the child-care setting that include:

- No more than 30 minutes per week, or never, while in child-care and early education settings;
- Work with families to ensure no more than two hours per day at home; and
- Provide screen time reduction education to parents at least twice a year.

Key Research Results

The results that follow reflect findings from the research analyses reviewing the current state of obesity prevention efforts in ECE settings as well as research examining the impact of any federal-level policy changes. The body of research supporting policy, systems, and environment changes for obesity prevention in young children has grown substantially over the last five years and additional evidence continues to emerge to support these efforts.

1. Federal, state, and local programs, regulations, and policy-based initiatives, working together, have the potential to change the food and physical activity environments for preschool children.^{16-18,39}
2. ECE environments that engage and educate children, parents, and caregivers in healthy behaviors play an important role in children's healthy eating and physical activity behaviors.⁴⁰⁻⁴⁴ Multi-component, multi-level ECE interventions that address dietary intake, physical activity, and screen time, and are coupled with parental engagement, are more likely to be effective in improving anthropometric outcomes (i.e., weight, BMI, body fat), however the magnitude of their effect remains difficult to assess due to the differences in measures and methodology.^{45,46}
3. Participation in CACFP promotes child-care environments that support healthy nutrition⁴⁷⁻⁴⁹ and children participating in CACFP have improved nutritional outcomes over non-participating children.⁵⁰
4. Strengthening screen time standards and policies at the child-care center, local, or state level could benefit children in early care and education environments.^{18,51,52}

5. Increased time spent in quality physical activity is associated with improvements in cognitive and motor development outcomes.⁵³⁻⁶² Improvements in the built environment have been shown to lead to increased levels of physical activity among children in ECE settings^{64, 67-69} and may have the potential to positively influence child weight status.^{16,52}
6. Interventions aimed at improving policies and practices may result in positive nutrition behavior change,⁷¹ and there is still room in many ECE settings to make further improvement in their nutrition policies, practices, and meal environments.^{47,72-74}
7. Research suggests that equipping ECE providers with the training, technical assistance, and resources to implement obesity prevention recommendations may positively influence child physical activity and nutrition behaviors.^{75,76}
8. Mounting evidence is consistent that health- and weight-related disparities exist among young children,^{77,78} including in child-care settings that serve ethnically diverse populations.⁷⁹ However, it is not yet well understood how resources should best be allocated and policies designed to promote health equity.⁷⁹

Studies Supporting Key Research Results

The details behind the key research results listed above will primarily be of interest to researchers and public and private funders of research in this area.

1. Federal, state, and local programs, regulations, and policy-based initiatives, working together, have the potential to change the food and physical activity environments for preschool children.^{16-18,39}

State child-care regulations and quality requirements are beginning to address healthy eating, screen time, and physical activity in ECE settings. Although just four states have specific regulations about the total amount of time kids should spend engaged in physical activity, 47 specifically regulate the amount of outdoor time that should be offered and 22 have guidelines around the use of screen time in the child-care setting.⁸⁰ There is still room for improvement, especially in state licensing regulations for infants.⁸¹ A 2013 review of state regulations promoting increased physical activity and decreased sedentary behaviors in infants in child-care found that only two states had regulations addressing all 5 NAM physical activity recommendations for infants and 25 states had none.⁸¹ Strengthening physical activity regulations to provide for more minutes of moderate and physical activity in the ECE setting has the potential to increase the amount

of time children are physically active, and reduce BMI and obesity-related healthcare costs.⁵²

Center-level policies, such as those created through Nutrition and Physical Activity Self-Assessment for Child Care (NAPSACC),^{18,82,83} and participation in federal programs such as CACFP⁴⁷⁻⁵⁰ and Head Start,^{49,84,85} have been shown to promote child-care environments that support healthy nutrition and reduce risk of obesity in some populations. Additionally, there is evidence to suggest that changes in Head Start wellness policies or practices in Head Start classes may have positive effects on the healthy eating behaviors and physical activity,⁸⁶ however, results on weight status remain mixed. One study examining the effectiveness of a six-month educational intervention to promote healthy eating and physical activity among Head Start staff, parents, and children demonstrated significant reductions in BMI and in the proportion of obese children and adults.⁸⁸ Another identified positive shifts toward healthier BMI categories for children participating in a nine-month health promotion program.⁸⁷ However, a seven-month wellness policy intervention showed a positive and significant effect on classroom Environment and Policy Assessment and Observations physical activity and EPAO total scores, but no significant changes in BMI.⁸⁶

The evidence is strongest for city and state policies and regulations related to beverages, screen time, and physical activity, which appear to have the greatest potential to improve young children's health behaviors, decrease BMI, and provide healthcare cost savings.^{52, 92-94} Implementing local wellness policies and training caregivers in best practices for physical activity and nutrition may also help reduce screen time⁹⁵ and promote healthy weight,⁷⁵ but may⁸⁶ or may not⁹⁵ improve the physical activity environment for young children in child-care settings. Policies related to how meals and snacks are served and how caregivers engage with children at mealtime may also influence caregiver behavior,⁵¹ though more research is needed in this area.

Three studies reported a need for improved compliance with local and state regulations and policies^{47,72,74} and two studies reported improvement in child nutrition and physical activity outcomes when wellness policies were implemented and caregiver training provided.^{71,75}

2. ECE environments that engage and educate children, parents, and caregivers in healthy behaviors play an important role in children's healthy eating and physical activity behaviors.⁴⁰⁻⁴ Multi-component, multi-level ECE interventions that address dietary intake, physical activity, and screen time, and are coupled with parental engagement, are more likely to be effective in improving anthropometric outcomes (i.e., weight, BMI, body

fat), however the magnitude of their effect remains difficult to assess due to the differences in measures and methodology.^{45,46}

ECE continues to be a critical environment on which to focus obesity prevention efforts, particularly for addressing diet and physical activity factors, because it can reach so many children.^{45,61,63,70,89-92} There is strong evidence pointing to the importance of integrating physical activity and nutrition topics into policies and practices, classroom activities, and parent engagement strategies; however, one consistent strategy for reducing obesity among preschool-aged children has yet to emerge.⁴⁵

In one study, ECE caregivers themselves reported that close communication with and engagement of parents were critical strategies for improving healthy growth trajectories of the children in their care.⁹⁶ This is supported by other research showing that parent-caregiver communication around fruit and vegetable intake—both at home and while in child-care—can be improved with targeted parent and family-focused interventions and communication strategies^{43,62, 88, 96-105} and that programs with a parent or family component can have positive effects on preschoolers' BMIs,¹⁰⁶ physical activity and sedentary behavior, and dietary intake.^{16,91,107} Teaching children about healthy eating has also been shown to have positive associations with identification of healthy foods,^{42,108} healthy snack selection,^{109,110} and fruit¹¹¹ and vegetable consumption.¹⁰⁷ However, even interventions integrating nutrition and physical activity into classroom activities with a positive impact on gross motor skills, physical activity, and receptive language development (an important indicator of school readiness), did not result in improvements to BMI at six months follow-up.⁶¹ Additionally, parental engagement and cultural sensitivity in preschool-based interventions may influence their success.^{89,90,112}

The Dietary Guidelines Advisory Committee Report found moderate evidence suggesting that multi-component obesity prevention approaches implemented in child-care settings improve weight-related outcomes in preschoolers. The report also noted that the large variation in interventions and approaches makes comparisons across studies challenging.¹³⁰ Multi-component interventions have had mixed results and there are no clear patterns for the specific combinations of components that are needed to have positive impacts on behavior or anthropometric outcomes. However, it is clear that interventions addressing multiple components are more successful than those focusing on only one aspect of obesity prevention.⁴⁵ Changing outdoor space, and attributes of that space, resulted in positive changes in child physical activity in two studies.^{64,70} but one study found ECE caregiver interaction during outdoor time may not improve children's physical activity as they tend to stop moving while engaging with

adults.⁶⁴ When the intervention focused on the same topic delivered to two different target audiences (i.e., parents and teachers receiving the same training) there were significant positive outcomes across multiple domains in some,^{61,63} but not all, studies.^{89,91} An intervention targeting role-modeling interventions in multiple audiences (parents and teachers in centers) found no significant improvement in BMI z-score after a six-month follow-up with children aged 2-5,⁹⁰ while another, which targeted center-based and combined center- and home-based care, reported increases in child physical activity, improvements in diet, and reductions in weight z-scores.¹⁶

A recent review of interventions in ECE settings found that the strength of an intervention (defined as a composite of the number of intervention strategies used), their potential impact (high vs. low depending on how the intervention was delivered, and the frequency and duration of their use) was positively correlated with anthropometric outcomes, but that the associations with behavioral outcomes, including physical activity, dietary intake, and screen time, especially in the absence of concurrent parent engagement, showed mixed effects.⁴⁵ Recognizing the extent to which multi-component intervention programs are implemented with fidelity is key to their potential to impact child weight and obesity.

3. Participation in CACFP promotes child-care environments that support healthy nutrition⁴⁷⁻⁴⁹ and children participating in CACFP have improved nutritional outcomes over non-participating children.⁵⁰

Research has demonstrated that attendance at a Head Start (which closely follows CACFP guidelines)⁴⁹ or CACFP-participating child-care center^{48,50} is associated with improved dietary intake compared to attendance at a non-CACFP participating sites. A statewide survey of child-care providers in California found CACFP sites in general, and Head Start centers in particular, served more fruits, vegetables, milk, and meat/meat alternatives, and fewer sweetened beverages and other sweets and snack-type items than non-CACFP sites. CACFP sites were also more aware of state beverage policies and significantly more sites in CACFP were fully compliant with those policies compared with non-CACFP sites.⁹²

Once the recently revised meal patterns are fully implemented, as required by October 2017, meals served through CACFP will allow for reimbursement of onsite breastfeeding, require fruits and vegetables to be served at lunch meals and infant snacks, limit service of fruit juice, require one whole grain serving per day, and limit added sugar in milk, yogurt, and ready-to-eat cereals.²¹ The Pew Charitable Trusts Health Impact Assessment (HIA)¹¹³ projected that children will benefit from the new meal patterns through increased intake of whole grains and vegetables and decreased consumption of grain-based

desserts. These improvements are expected to enhance the quality of meals served in CACFP to help young children learn healthy eating habits early on in their lives.¹¹³ Research also shows that increased reimbursement rates for CACFP meals and snacks served may also help support healthy meals, snacks, and improved eating environments.^{47,114}

4. Strengthening screen time standards and policies at the child-care center, local, or state level could benefit children in ECE environments, particularly for older preschool-aged kids.^{18,51,52}

Research on current screen time practices in the child-care setting is limited. Using parent and child-care provider self-reported data from 8,950 children in the Early Childhood Longitudinal Study-Birth Cohort, it was estimated that by preschool age (3-5 years old), children were exposed to an average of 4.1 hours of screen time daily, including 0.4 hours in the child-care setting.¹¹⁵ A 2014 review of U.S. state regulations regarding physical activity and sedentary activity in the child-care setting found that twenty (40 percent) and twenty-three (46 percent) states had licensing and administrative regulations consistent with national recommendations for limiting screen time in child-care centers and child-care homes, respectively, suggesting that there is still room for improvement in reducing screen time in the child-care environment.¹⁵ On the other hand, cross-sectional, observational analyses of physical activity and screen time policies and practices in 50 child-care settings in the state of North Carolina found that 98 percent of the centers had practices in line with current recommendations (<30m/day/child).⁹⁵ Three meta-analyses recently examined the effects of screen time reduction interventions on screen time consumption and on BMI. Two showed positive associations between screen time reduction interventions and a reduction in the amount of screen time in school children⁹⁷ and when data from children and adults were pooled.⁹⁸ One showed mixed results in older children, but showed promise among preschoolers.⁹⁹

5. Increased time spent in quality physical activity is associated with improvements in cognitive and motor development outcomes.⁵³⁻⁶² Improvements in the built environment have been shown to lead to increased levels of physical activity among children in ECE settings,^{64, 67-69} and may have the potential to positively influence child weight status.^{16,52}

There is strong evidence for the importance of physical activity and the physical environment, and their role in positive cognitive and motor development outcomes.^{16,53,54,61} And despite a lack of consensus regarding the amount of recommended physical activity,^{31,35-37} a body of high-quality evidence suggests that physical activity within child-care centers and homes is typically

lower, while sedentary behaviors are typically higher, than any of the existing recommended levels.^{31,100}

Three interventions aimed to make changes in the built environment and physical layout of outdoor spaces identified the potential to improve social behavior, decrease sedentary time, increase light physical activity, and increase moderate to vigorous physical activity among children in child-care.^{64, 67,69} Two randomized-controlled trials (RCT)^{56,57} compared a physical activity classroom intervention to control setting and found statistically significant changes in BMI. One RCT study found non-statistically significant improvements in BMI at follow-up and one year later,¹¹² while three others found no significant effect on BMI or BMI z-score.^{83,90,102} Increasing opportunities for, and improving instruction of, physical activity for preschoolers (including increased total time spent in PA) is associated with improvements in cognitive and motor development outcomes in eleven,^{16, 53-62} but not two,^{95,96} studies.

6. Interventions aimed at improving policies and practices may result in positive nutrition behavior change,⁷¹ and there is still room in many ECE settings to make further improvement in their nutrition policies, practices, and meal environments.^{47,72-74}

While there have been positive changes in policies that support healthy eating, there is room for improvement in existing nutrition practices, policies, and meal environments in ECE settings.^{47,73,74} Positive changes include decreasing the availability of juice,⁷² increasing the variety of vegetables, reducing the frequency of serving high-fat meats, and increasing high-fiber and whole-grain foods⁷⁴ through the adoption of local policies. Issues surrounding implementation of, and compliance with, existing policies also remain. The wide range of topics caregivers are asked to address—including creating wellness policies, improving the quality of foods served, promoting breastfeeding, and serving as healthy role models—poses a challenge for many ECE providers. Support and additional training are needed to help ECE settings and caregivers implement the range of recommended policies aimed at improving healthful practices and to identify which could have the highest impact.^{40,41,45,46,71,75,94,116-118}

Intervention studies with a focus on fruits and vegetables that looked at manipulating the variety, portion size, exposure, recipe modification, peer behaviors, nutrition education, or garden-based experiential learning, all show promise as strategies to increase fruit and vegetable intake, though no clear strategy emerges as the most effective.^{96,106,110,111,119-122} Finally, involving parents in education and training of healthy role modeling, coupled with center-based menu modifications, may increase children's fruit and vegetable intake and decrease their junk food intake over the course of the school year.⁹¹

7. Research suggests that equipping ECE providers with the training, technical assistance, and resources to implement obesity prevention recommendations may play a role in child physical activity and nutrition behaviors.^{75,76}

Two studies have shown improvements in child physical activity and healthy eating^{58,75} through provision of caregiver training, however one study found neither training nor technical assistance were associated with compliance with the regulations related to healthy beverages.⁷¹ The type of child-care setting may influence this relationship. One cross-sectional study conducted in California found that home child-care providers were more likely to have had nutrition or health training, be involved with health promotion activities, and rate their influence higher on children's health behaviors compared to providers in larger child-care centers.¹²³

ECE-setting policies appear to influence caregiver behavior. While three interventions to help caregivers develop policies resulted in improved dietary behaviors, decreased screen time, and increased physical activity, changes in BMI were mixed.^{86,87,90} One study finding BMI reductions showed parent and child weight changes were correlated, suggesting a role for caregiver and parental modeling and shared behavior.⁸⁷ Center-based interventions coupled with teacher or caregiver training showed promising results with three interventions showing increases in child physical activity, consumption of healthy foods, and reductions in child weight and BMI,^{16,56,57} though at least one intervention did not result in significant BMI change.⁸⁶

Additionally, the types of interactions between caregivers and children may impact activity levels. One study found that any type of teacher interaction (including positive) decreased the amount of children's physical activity, because children tend to stop what they are doing when an adult addresses them, engages in a conversation, or coordinates play activities. When teachers were not observed in the area, children experienced increased PA.⁶⁴ This finding suggests a need to equip caregivers with training to promote activity, rather than interrupt it.

Another study conducted prior to recent changes to the federal standards for Head Start found that caregiver attitudes toward family-style meals may vary by setting, exposure, and training level; Head Start and CACFP-participating child-care providers reported motivation to practice family style meal service, while non-CACFP providers expressed concerns that family-style dining was resource-intensive.¹²⁴ Similar research examining differences in caregiver attitudes towards family-style dining have not been conducted following the removal of the requirement for family-style meals from the federal standards.

8. Mounting evidence is consistent that health- and weight-related disparities exist among young children, including in child-care settings that serve ethnically diverse populations.⁷⁹ However, it is not yet well understood how resources should best be allocated and policies designed to further improve child-care environments and promote health equity.⁷⁹

Currently, over 9 million American children are overweight or obese. Disparities in obesity risk emerge in early childhood, with African-American and low-income youth suffering a disproportionate burden of morbidity associated with this growing epidemic.^{125,126} Yet to date, interventions to address obesity have mainly overlooked the contribution of early childhood adversities (including the impact of low socioeconomic status)¹²⁷ and many existing obesity prevention initiatives fail to convene around a shared agenda to prevent early life adversities. For example, a recent review identified only five studies that have addressed whether the nutritional quality of foods and beverages provided to toddlers and preschoolers in child-care may differ according to urban/rural location or the demographic characteristics of the community; similar measures were not consistently used across studies and the results are not readily generalizable.⁷⁹ Addressing the inequities in social structure and processes that drive disparities in obesity prevalence¹²⁸ is critical for achieving a healthy weight for everyone.¹²⁹ Impacting these weight-related disparities, however, will require building on cross-sector efforts to increase healthy options, providing equity in distributing economic resources, building community capacity, and decreasing deterrents to healthy behaviors in circumstances of systematic social disadvantage.¹²⁹

Conclusion

Evidence has strengthened over the past five years that obesity prevention interventions involving multiple approaches, coupled with parental engagement, offer the most promising opportunities to improve dietary intake, increase physical activity, and reduce screen time, as well as to change anthropometric outcomes. Compared with the 2011 HER/ALR Research Synthesis, the body of research in this field has increased significantly with stronger positive outcomes resulting from policy, systems, and environmental interventions. The correlation between parental engagement in obesity-prevention practices is better understood, however there remains some uncertainty over the combinations of specific strategies that will consistently provide positive outcomes in obesity prevention.

Federal, state, and local programs, regulations, and policy-based initiatives present key opportunities to improve nutrition and physical activity environments, and support positive outcomes for children and families. However, there remains a need for additional research to pinpoint the most promising combination of intervention strategies, and to

identify opportunities to further strengthen regulatory efforts to improve health, and reduce health inequity, for all young children in ECE settings. Furthermore, additional funding and opportunities for training and technical assistance for child-care providers is necessary to ensure that caregivers have adequate knowledge and resources to develop and implement strong health promotion policies, and to ensure that access to these resources serves to decrease, not increase, current health disparities across economic and racial/ethnic groups.

Future Research Directions

Obesity prevention interventions and policies have the potential to offer lifelong benefits for young children. While many recent studies have focused on these topics, unanswered questions remain about the most effective interventions and how to broadly implement those interventions. Specific research directions include:

- Studying the feasibility and effectiveness of targeted behavioral versus broad environmental interventions;
- Identification of barriers and accelerators to achieving recommended physical activity levels;
- Examining the keys to successful behavioral intervention implementation, including technical assistance, peer support, and resources for parental education;
- Explaining inconsistencies in behavioral outcomes, specifically how the strength of interventions impacts these outcomes;
- Evaluating the national impact of recent federal policy changes, such as updates to CACFP meal patterns and Head Start Performance Standards. In addition, studies are needed to evaluate the cost of the changes and identify barriers and facilitators to providing healthy meals and snacks;
- Assessing the impact of state and local regulations for child-care facilities on the dietary and physical activity behaviors of preschool-aged children;
- Investigating understudied populations to better understand how possible interactions of intervention design and characteristics such as race, ethnicity, socioeconomic background, and types of child-care settings may impact the success of obesity prevention interventions;
- Examining effective practices and interventions for childhood obesity prevention in infants and toddlers;
- Evaluating effective strategies to engage parents and modify parent behavior both in and outside the child-care setting; and

- Evaluating multi-component programs tailored for diverse groups; the development and evaluation of interventions for preschool children in low-income and racial and ethnic minority communities should be a priority given the disproportionate impact of obesity among these youth.

Policy Recommendations

There are a variety of policy opportunities at the federal, state, and local levels to improve nutrition and physical activity among children in child-care settings. Implementation of new and updated federal requirements, as well as the continued strengthening of state and local regulations, policies, and quality standards, all hold promise to positively change nutrition and physical activity environments.

Strengthen and support federal initiatives

- USDA should continue to support state agencies and providers as they work to implement updated CACFP nutrition standards and wellness policy best practices in participating child-care centers and family child-care homes. Support should include training, technical assistance, resource development, and a constructive review process.
- USDA, the U.S. Department of Health and Human Services (HHS), and the U.S. Department of Education (DOE) should continue to encourage child-care centers and family child-care homes to provide: opportunities for structured and unstructured daily physical activity, screen time limits, healthy beverage options, and address inequities by ensuring access to culturally and developmentally appropriate meals and snacks.
- USDA and HHS should continue to encourage state licensing entities to include criteria for nutrition and wellness standards in licensing determinations.
- All Head Start and Early Head Start programs should adopt CACFP Best Practices for nutrition and physical activity as outlined in the final rule implementing the updated CACFP meal standards.
- HHS and DOE should explore other opportunities to improve nutrition and physical activity such as through timely implementation of updated regulations in response to changes in CCDBG including requiring CCDBG-participating states to disseminate information to families about nutrition assistance programs (i.e., WIC, SNAP) that are available to them, ensuring that eligible providers are enrolled in CACFP; and supporting efforts to develop high-quality nutrition and physical standards within licensing requirements or Quality Rating and Improvement Systems.
- Federal programs (i.e. CACFP, CCDBG, Head Start) and public-private partnerships such as Let's Move Child Care should ensure there is appropriate funding to support training and technical assistance for obesity prevention in the child-care setting.
- USDA, HHS, and DOE should ensure that federal regulations and guidelines are regularly updated based on the latest research and evidence-based effective strategies for the promotion of overall health and wellness for children in child-care.

Focus state and local policy efforts on strategies to prevent childhood obesity

- State and local agencies should continue to update state and local regulations to set minimal requirements or standards for childhood obesity prevention practices as part of child-care licensing requirements, including: healthy eating, breastfeeding, physical activity, and screen time. Requirements should be based on the most recent evidence-based guidance from respected sources such as the *Dietary Guidelines for Americans*, the National Academies of Sciences, the American Academy of Pediatrics, and *Caring for Our Children: National Health and Safety Performance Standards*.
- States should include specific quality standards for childhood obesity prevention as part of state Quality Rating and Improvement Systems (QRIS).
- State and local agencies should preserve funding and increase opportunities for linguistically and culturally appropriate training and technical assistance for child-care and preschool staff to support healthy eating, physical activity, and parent education and engagement. Assess the impact of training and technical assistance.

Preserve and promote funding for obesity prevention

- Organizations involved in advocating for and working with quality child-care and education settings should encourage agencies that are administering prevention and nutrition assistance funds, as well as other funders such as the National Institutes of Health and the Agency for Healthcare Research and Quality, to support innovative pilots with rigorous evaluations to build more evidence on what works to promote healthy eating, physical activity, and screen time reduction in child-care settings.
- Federal, state and local agencies and organizations should work to implement and disseminate promising policies and practices for obesity prevention, such as by investing in translational research.

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References

1. Larson N, Ward D, Neelon SB, Story M. Preventing Obesity among Preschool Children: How Can Child-Care Settings Promote Healthy Eating and Physical Activity? Research Synthesis. 2011. Robert Wood Johnson Foundation.
2. Ogden CL, Carroll MD, Lawman, HG. Trends in Obesity Prevalence Among Children and Adolescents in the United States, 1988-1994 Through 2013-2014. *JAMA*. 2016;315(21):2292-2299. doi:10.1001/jama.2016.6361.
3. Childhood Obesity Facts. Centers for Disease Control and Prevention website. <http://www.cdc.gov/healthyyouth/obesity/facts.htm>. Updated January 25, 2017. Accessed February 25, 2016.
4. Costa S, Adams J, Phillips, V, Benjamin Neelon, SE. The relationship between child care and adiposity, body mass and obesity-related risk factors: protocol for a systematic review of longitudinal studies. *Syst Rev*. 2016; 5:141. Published online 2016 Aug 17. doi: 10.1186/s13643-016-0312-7.
5. Geoffroy MC, Power C, Touchette E, et al. Child care and overweight or obesity over 10 years of follow-up. *J Pediatr*. 2013;162(4):753-758. doi: 10.1016/j.jpeds.2012.09.026.
6. McGrady ME, Mitchell MJ, Theodore SN, Sersion B, Holtzapple E. Preschool participation and BMI at kindergarten entry: the case for early behavioral intervention. *J Obes*. 2010;2010:360407. doi: 10.1155/2010/360407.
7. Isong IA, Richmond T, Kawachi I, et al. Child care Attendance and Obesity Risk. *Pediatrics*. 2016;138(5): e20161539.
8. Laughlin, Lynda. 2013. *Who's Minding the Kids? Child Care Arrangements, Spring 2011*. Current Population Reports, P70- 135. U.S. Census Bureau, Washington, DC.
9. Susman-Stillman A, Banghart P. Quality in Family Friend, and Neighbor Child Care Settings. National Center for Children in Poverty website. http://www.nccp.org/publications/pub_1010.html. Published May 2011, Accessed March 13, 2017.
10. Vital Signs: Obesity Among Low-Income, Preschool-Aged Children — United States, 2008–2011. *MMWR*. 2013. 62(31);629-634. Centers for Disease Control and Prevention website. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6231a4.htm>. Accessed January 25, 2017.
11. Pan L, Freedman DS, Sharma AJ, Castellanos-Brown K, Park S, Smith RB, Blanck HM. Trends in Obesity Among Participants Aged 2-4 Years in the Special Supplemental Nutrition Program for Women, Infants, and Children—United States, 2000-2014. *MMWR Morb Mortal Wkly Rep* 2016; 65(45). <https://www.cdc.gov/obesity/downloads/twic-science-in-brief.pdf>
12. Ogden CL, Carroll MD, Fryar CD, Flegal KM. Prevalence of obesity among adults and youth: United States, 2011–2014. NCHS data brief, no 219. Hyattsville, MD: National Center for Health Statistics. 2015.
13. Flores G, Committee on Pediatric Research. Technical Report: Racial and Ethnic Disparities in the Health and Health Care of Children. 2010. *Pediatrics*. 125(4):e979-e1020.
14. The State of Obesity: Better Policies for a Healthier America 2016. Trust for America's Health and The Robert Wood Johnson Foundation website. <http://stateofobesity.org/files/stateofobesity2016.pdf>. Accessed Nov 17, 2016.
15. Achieving a State of Healthy Weight. National Resource Center (NRC) for Health and Safety in Child Care and Early Education website; 2015. <http://nrckids.org/index.cfm/products/achieving-a-state-of-healthy-weight1/>. Accessed October 6, 2016.
16. Yin Z, Parra-Medina D, Cordova A. Míranos! Look at us, we are healthy! An environmental approach to early childhood obesity prevention. *Child Obes*. November 2012, 8(5): 429-439. doi: 10.1089/chi.2012.0125.
17. Sekhobo JP, Edmunds LS, Dalenius K, et al. Neighborhood Disparities in Prevalence of Childhood Obesity Among Low-Income Children Before and After Implementation of New York City Child Care Regulations. *Prev Chronic Dis*. 2014;11:140152. DOI: <http://dx.doi.org/10.5888/pcd11.140152>.
18. Battistaa RA, Oakleya H, Weddella MS, Muddb LM, Greenec JB, Westa ST. Improving the physical activity and nutrition environment through self-assessment (NAP SACC) in rural area child care centers in North Carolina. *Prev Med*. 2014; 67(Supplement 1):S10–S16.
19. Child Nutrition Tables. United States Department of Agriculture, Food and Nutrition Service website. <https://www.fns.usda.gov/pd/child-nutrition-tables>. Accessed on Jan 31, 2017.
20. School Meals: Income Eligibility Guidelines. United States Department of Agriculture, Food and Nutrition Service's website. <https://www.fns.usda.gov/school-meals/income-eligibility-guidelines>. Accessed on Jan 31, 2017.

21. Child and Adult Care Food Program: Meal Pattern Revisions Related to the Healthy, Hunger-Free Kids Act of 2010; Final Rule. 7 CFR Parts 210, 215, 220. United States Department of Agriculture website. <https://www.gpo.gov/fdsys/pkg/FR-2016-04-25/pdf/2016-09412.pdf>. Accessed on October 12, 2016.
22. Maalouf J, Evers SC, Griffin M, Lyn R. Assessment of Mealtime Environments and Nutrition Practices in Child Care Centers in Georgia. *Child Obes*. 2013; Volume 9(5): 437-445. DOI: 10.1089/chi.2013.0018.
23. Child Care Development Fund Reauthorization, Office of Child Care. Office of the Administration for Children and Families website. <http://www.acf.hhs.gov/occl/ccdf-reauthorization>. Accessed on October 13, 2016.
24. Overview of 2016 Child Care and Development Fund Final Rule. Department of Health and Human Services, Administration for Children and Families website. https://www.acf.hhs.gov/sites/default/files/occl/ccdf_final_rule_fact_sheet.pdf. Accessed on February 1, 2017.
25. Presenting the new Head Start Performance Standards. US Department of Health and Human Services, Administration for Children and Families website. <https://eclkc.ohs.acf.hhs.gov/policy/presenting>. Accessed on October 1, 2016.
26. Head Start Performance Standards: 45 CFR Chapter XIII RIN 0970-AC63. Department of Health and Human Services Administration for Children and Families website. <http://eclkc.ohs.acf.hhs.gov/hslc/hs/docs/hspss-final.pdf>. Accessed February 2, 2017.
27. Healthy Eating, Active Play, Screen Time Best Practices. Public Health Law Center website. <http://www.publichealthlawcenter.org/health/ChildCareMaps.html>. Accessed on May 5, 2017.
28. Early Care and Education State Indicator report, 2016. Centers for Disease Control website. <https://www.cdc.gov/obesity/downloads/early-care-education-report.pdf>. Accessed on January 30, 2017.
29. Spectrum of Opportunities for Obesity Prevention in the Early Care and Education Setting (ECE). CDC Technical Assistance Briefing Document website. http://www.cdc.gov/obesity/downloads/spectrum-of-opportunities-for-obesity-prevention-in-early-care-and-education-setting_tabriefing.pdf. Accessed on October 12, 2016.
30. State Quality Rating and Improvement Systems. Strategies to Support Achievement of Healthy Eating and Physical Activity Practices in Early Care and Education Settings. Nemours Children's Health System. June 2016.
31. Institute of Medicine of the National Academies, Committee on Obesity Prevention Policies for Young Children, Birch LL, Parker L, and Burns A, eds. *Early childhood obesity prevention policies*. Washington, DC: The National Academies Press; 2011.
32. Department of Health and Ageing. National physical activity guidelines for Australians. Physical activity recommendations for 0–5 year olds. Commonwealth of Australia: Canberra, Australia, 2010.
33. Department of Health, Physical Activity, Health Improvement and Protection. Start active, stay active: A report on physical activity for health from the four home countries' chief medical officers. Department of Health, Physical Activity, Health Improvement and Protection: London, 2011.
34. Canadian physical activity guidelines and Canadian sedentary behaviour guidelines: Your plan to get active every day. 2012. Canadian Society for Exercise Physiology website. www.csep.ca/guidelines. Last updated November 3, 2014. Accessed December 12, 2016.
35. Society of Health and Physical Educators (SHAPE). Active start: A statement of physical activity guidelines for children from birth to age 5. 2nd ed. Reston, VA: SHAPE America; 2009. www.shapeamerica.org/standards/guidelines/activestart.cfm. Accessed on October 14, 2016.
36. American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care and Early Education. *Caring for Our Children: National Health and Safety Performance Standards Guidelines for Early Care and Education Programs*, 3rd edition. National Resource Center for Health and Safety in Child Care and Early Education; 2012.
37. Let's Move! Child Care: Get Kids Moving. Nemours. Children's Health System. Healthy Kids Healthy Future website. <https://healthykidshealthyfuture.org/5-healthy-goals/get-kids-moving/>. Accessed on October 14, 2016.
38. Healthy Digital Media Use Habits for Babies, Toddlers & Preschoolers. American Academy of Pediatrics website. <https://www.healthychildren.org/English/family-life/Media/Pages/Healthy-Digital-Media-Use-Habits-for-Babies-Toddlers-Preschoolers.aspx>. Accessed on November 3, 2016.
39. Nonas C, Silver LD, Kettel Khan L, Leviton L. Rationale for New York City's Regulations on Nutrition, Physical Activity, and Screen Time in Early Child Care Centers. *Prev Chronic Dis*. 2014;11:130435. DOI: <http://dx.doi.org/10.5888/pcd11.130435>.
40. Treviño RP, Vasquez L, Shaw-Ridley M, Mosley D, Jechow K, Piña C. Outcome of a Food Observational Study Among Low-Income Preschool Children Participating in a Family-Style Meal Setting. *Health Educ Behav*. 2015;42(2):240–248.
41. Lucas A, McMahon PM, Asling MB, Knobloch A, Kosh E, Sims K. Assessing Child Care Providers' Knowledge and Attitudes Regarding Support of Breastfeeding in a Region with Low Breastfeeding Prevalence. *J Hum Lact*. 2013;29(4):556–563. DOI:10.1177/0890334413497259.
42. Sigman-Grant M, Byington TA, Lindsay AR et al. Preschoolers can distinguish between healthy and unhealthy foods: the all 4 kids study. *J Nutr Educ Behav*. 2014;46(2):121-127.
43. Hunsaker SL. Effectiveness of a Parent Health Report in Increasing Fruit and Vegetable Consumption Among Preschoolers and Kindergarteners. PhD Dissertation. 2015. All Theses and Dissertations. Paper 5498. Accessed at: <http://scholarsarchive.byu.edu/cgi/viewcontent.cgi?article=6497&context=etd>.
44. Erinoshio T, Dixon LB, Young C, Brotman LM, Hayman LL. Caregiver food behaviours are associated with dietary intakes of children outside the child-care setting. *Pub Health Nutr*. 2012;16(7): 1263–1272. doi:10.1017/S136898001200345X.
45. Ward DS, Welker E, Choate A, et al. Strength of obesity prevention interventions in early care and education settings: A systematic review. *Prev Med*. 2017 Feb;95 Suppl:S37-S52. DOI: 10.1016/j.ypmed.2016.09.033. Epub 2016 Sep 28.

46. Lessard L, Lesesne C, Kakietek J, et al. Measurement of Compliance With New York City's Regulations on Beverages, Physical Activity, and Screen Time in Early Child Care Centers. *Prev Chronic Dis*. 2014;11:130433. DOI: <http://dx.doi.org/10.5888/pcd11.130433>.
47. Liu ST, Graffagno CL, Leser KA, Trombetta A, Pirie PL. Obesity Prevention Practices and Policies in Child Care Settings Enrolled and Not Enrolled in the Child and Adult Care Food Program. *Matern Child Health J*. 2016;20:1933. doi:10.1007/s10995-016-2007-z.
48. Ritchie LD, Boyle M, Chandran K, et al. (2012). Participation in the child and adult care food program is associated with more nutritious foods and beverages in child care. *Childhood Obesity (Formerly Obesity and Weight Management)*. 2012;8(3): 224-229.
49. Dev DA, McBride BA. The STRONG Kids Research Team. Academy of Nutrition and Dietetics Benchmarks for Nutrition in Child Care 2011: Are Child-Care Providers across Contexts Meeting Recommendations? *J Acad Nutr Diet*. 2013;113:1346-1353. <http://dx.doi.org/10.1016/j.jand.2013.05.023>.
50. Korenman S, Abner KS, Kaestner R, Gordon RA. The Child and Adult Care Food Program and the Nutrition of Preschoolers. *Early Child Res Q*. 2013; 28(2). doi:10.1016/j.ecresq.2012.07.007.
51. Erinosh TO, Hales DP, McWilliams CP, Emunah J, Ward DS. Nutrition policies at child-care centers and impact on role modeling of healthy eating behaviors of caregivers. *J Acad Nutr Diet*. 2012;112(1):119-24. doi: 10.1016/j.jada.2011.08.048. Epub 2011 Dec 22.
52. Wright DR, Kenney EL, Giles CM. Modeling the Cost Effectiveness of Child Care Policy Changes in the U.S. *Am J Prev Med*. 2015;49(1):135-47. doi:10.1016/j.amepre.2015.03.016.
53. Rosey F, Keller J, Golomer E. Impulsive-reflective attitude, behavioural inhibition and motor skills: Are they linked? *Int J Behav Dev*. 2010;34(6):511-520.
54. Rhemtulla M, Tucker-Drob EM. Correlated longitudinal changes across linguistic, achievement, and psychomotor domains in early childhood: evidence for a global dimension of development. *Dev. Sci*. 2011;14(5):1245-1254.
55. Palmer KK, Miller MW, Robinson LE. Acute exercise enhances preschoolers' ability to sustain attention. *J Sport Exerc Psychol*. 2013;35(4):433-437.
56. Annesi JJ, Smith AE, Tennant GA. Effects of a cognitive behaviorally based physical activity treatment for 4- and 5-year old children attending U.S. preschools. *Int J Behav Med*. 2013a;20:562-566. <http://dx.doi.org/10.1007/s12529-013-9361-7>.
57. Annesi JJ, Smith AE, Tennant GA. Reducing high BMI in African American preschoolers: effects of a behavior-based physical activity intervention on caloric expenditure. *South Med J*. 2013b;106:456-459. <http://dx.doi.org/10.1097/SMJ.0b013e3182a05bef>.
58. Becker DR, McClelland MM, Loprinzi P, Trost SG. Physical activity, self-regulation, and early academic achievement in preschool children. *Early Educ Dev*. 2014;25(1):56-70.
59. Kirk SM, Vizcarra CR, Looney EC, Kirk EP. Using physical activity to teach academic content: a study of the effects on literacy in head start preschoolers. *Early Child Educ J*. 2014;42(3):181-189.
60. De Marco AC, Zeisel S, Odom SL. An evaluation of a program to increase physical activity for young children in child care. *Early Educ Dev*. 2015;26:1-21.
61. Winter SM, Sass DA. Healthy & ready to learn: examining the efficacy of an early approach to obesity prevention and school readiness. *J Res Child Educ*. 2011;25:304-325.
62. Jones RA, Riethmuller A, Hesketh K, Trezise J, Batterham M, Okely AD. Promoting fundamental movement skill development and physical activity in early childhood settings: a cluster randomized controlled trial. *Pediatr Exerc Sci*. 2011 Nov;23(4):600-15.
63. Trost SG, Messner L, Fitzgerald K, Roths B. A Nutrition and Physical Activity Intervention for Family Child Care Homes. *Am J Prev Med*. 2011;41(4):392-398. doi: 10.1016/j.amepre.2011.06.030.
64. Cosco NG, Moore RC, Smith WR. Childcare outdoor renovation as a built environment health promotion strategy: evaluating the preventing obesity by design intervention. *Am J Health Promot*. 2014 Jan-Feb;28(3 Suppl):S27-32. doi: 10.4278/ajhp.130430-QUAN-208.
65. Alhassan S, Nwaokemele O, Ghazarian M, Roberts J, Mendoza A, Shitole S. Effects of Locomotor Skill Program on Minority Preschoolers' Physical Activity Levels. *Pediatr Exerc Sci*. 2012;24(3):435-449. doi: <http://dx.doi.org/10.1123/pes.24.3.435>.
66. Alhassan S, Nwaokemele O, Lyden K, Goldsby T, Mendoza A. A pilot study to examine the effect of additional structured outdoor playtime on preschoolers' physical activity levels. *Child Care Pract*. 2013;19:23-35.
67. Nicaise V, Kahan D, Reuben K, Sallis JF. Evaluation of a redesigned outdoor space on preschool children's physical activity during recess. *Pediatr Exerc Sci*. 2012;24(4):507-518.
68. Annesi JJ, Smith AE, Tennant GA. Effects of the start for life treatment on physical activity in primarily African American preschool children of ages 3-5 years. *Psychol Health Med*. 2013;18(3):300-309.
69. Coe D, Flynn JI, Wolff-Hughes DL, Scott SN, Durham S. Children's Physical Activity Levels and Utilization of a Traditional versus Natural Playground. *Child Youth Environ*. 2014;24(3):1-15. DOI: 10.7721/chilyoutenvi.24.3.0001.
70. Benjamin Neelon SE, Taveras EM, Østbye T, Gillman MW. Preventing Obesity in Infants and Toddlers in Child Care: Results from a Pilot Randomized Controlled Trial. *Matern Child Health J*. 2014;18:1246-1257. DOI 10.1007/s10995-013-1359-x.
71. Kakietek J, Dunn L, O'Dell SA, Jernigan J, Kettel Khan L. Training and Technical Assistance for Compliance With Beverage and Physical Activity Components of New York City's Regulations for Early Child Care Centers. *Prev Chronic Dis*. 2014;11:130434. DOI: <http://dx.doi.org/10.5888/pcd11.130434>.
72. Tandon PS, Garrison MM, Christakis DA. Physical Activity and Beverages in Home- and Center-based Child Care Programs. *J Nutr Educ Behav*. 2012; 44(4): 355-359.

73. Benjamin Neelon SE, on behalf of the American Dietetic Association. Position of the American Dietetic Association: Benchmarks for Nutrition in Child Care. *J Am Diet Assoc.* 2011;111:607-615.
74. Sisson SB, Campbell JE, May KB, Brittain DR, Monroe LA, Guss, SH, Ladner JL. Assessment of Food, Nutrition, and Physical Activity Practices in Oklahoma Child-Care Centers. *J Acad Nutr Diet.* 2012;112:1230-1240.
75. Lyn R, Maalouf J, Evers S, Davis J, Griffin M. Nutrition and physical activity in child care centers: the impact of a wellness policy initiative on environment and policy assessment and observation outcomes, 2011. *Prev Chronic Dis.* 2013;10:E83. doi: 10.5888/pcd10.120232.
76. Reynolds MA, Cotwright CJ, Polhamus B, Gertel-Rosenberg A, Chang D. Obesity Prevention in the Early Care and Education Setting: Successful Initiatives across a Spectrum of Opportunities. *J Law Med Ethics.* 2013 Winter;41(s2):8-18. doi:10.1111/jlme.12104.
77. Institutes of Medicine. *Accelerating progress in obesity prevention: Solving the weight of the nation.* Washington: The National Academies Press. 2012.
78. Flores G, Committee on Pediatric Research, Technical Report: Racial and Ethnic Disparities in the Health and Health Care of Children. *Pediatrics.* 2010;125(4):e979-e1020.
79. Larson N, Looby AA, Frost N, Nanney MS, Story N. What can be learned from existing research on weight-related disparities in child care settings? A call for surveillance and evaluation efforts. In publication.
80. Duffey KJ, Slining MM, Benjamin Neelon SE. States lack physical activity policies in child care that are consistent with national recommendations. *Child Obes.* 2014;10(6):491-500. doi: 10.1089/chi.2014.0096.
81. Slining MM, Neelon SE, Duffey KJ. A review of state regulations to promote infant physical activity in child care. *Int J Behav Nutr Phys Act.* 2014;11:139. doi: 10.1186/s12966-014-0139-3.
82. Alkon A, Crowley AA, Benjamin Neelon SE et al. Nutrition and physical activity randomized control trial in child care centers improves knowledge, policies, and children's body mass index. *BMC Pub Health.* 2014;14(1):215. DOI: 10.1186/1471-2458-14-215.
83. Bonis M, Loftin M, Ward D, Tseng TS, Clesi A, Sothorn M. Improving physical activity in daycare interventions. *Child Obes.* 2014;10(4):334-41. doi: 10.1089/chi.2014.0040. Epub 2014 Jul 23.
84. Lee K, Won S. Effect of Enrollment Length in Migrant Head Start on Children's Weight Outcomes. *Health Soc Work.* 2015;40(2):142-150.
85. Buchholz EM, Desai MM, Rosenthal, MS. Dietary Intake in Head Start vs. Non-Head Start Preschool-Aged Children: Results from the 1999-2004 National Health and Nutrition Examination Survey. *J Am Diet Assoc.* 2011;111:1021-1030. doi: 10.1016/j.jada.2011.04.009.
86. Esquivel M, Nigg CR, Fialkowski MK, Braun KL, Li F, Novotny R. Head Start Wellness Policy Intervention in Hawaii: A Project of the Children's Healthy Living Program. *Child Obes.* 2016;12(1):26-32. doi: 10.1089/chi.2015.0071. Epub 2016 Jan 15.
87. Herman A, Nelson BB, Teutsch C, Chung PJ. "Eat Healthy, Stay Active!": A Coordinated Intervention to Improve Nutrition and Physical Activity among Head Start Parents, Staff, and Children. *Am J Health Promo.* 2012;27(1):e27-e36.
88. Kunkel K, Hurtado G, Conrad S, Routh B, Joeng J, Harrison M. Lessons in a Box Make a Difference for Head Start Youth. *J Exten.* 2013;51(3):3RIB4.
89. Fitzgibbon ML, Stolley ML, Schiffer L. Family-based hip-hop to health: Outcome results. *Obesity.* 2013; 21(2): 274-283.
90. Natale RA, Lopez-Mitnik G, Uhlhorn SB, Asfour L, Messiah SE. Effect of a Child Care Center-Based Obesity Prevention Program on Body Mass Index and Nutrition Practices Among Preschool-Aged Children. *Health Promot Pract.* 2014; 15(5): 695-705.
91. Natale RA, Messiah SE, Asfour L, Uhlhorn SB, Delemater A, Arheart KL. Role modeling as an early childhood obesity prevention strategy: effect of parents and teachers on preschool children's healthy lifestyle habits. *J Dev Behav Pediatr.* 2014b;35(6):378-387.
92. Ritchie LD, Sharma S, Gildengorin G, Yoshida S, Braff-Guajardo E, Crawford P. Policy Improves What Beverages Are Served to Young Children in Child Care. *J Acad Nutr Diet.* 2015;115:724-730.
93. Stephens RL, Xu Y, Lesesne CA, Dunn L, Kakietek J, Jernigan J, Khan LK. Relationship Between Child Care Centers' Compliance With Physical Activity Regulations and Children's Physical Activity, New York City, 2010. *Prev Chronic Dis.* 2014;11:130432. DOI: <http://dx.doi.org/10.5888/pcd11.130432>.
94. Kakietek J, Osuji TA, O'Dell SA, Breck A, Kettel Khan L. Compliance With New York City's Beverage Regulations and Beverage Consumption Among Children in Early Child Care Centers. *Prev Chronic Dis.* 2014;11:130430. DOI: <http://dx.doi.org/10.5888/pcd11.130430>.
95. Erinoshio T, Hales D, Vaughn A, Mazzucca S, Ward DS. Impact of Policies on Physical Activity and Screen Time Practices in 50 Child-Care Centers in North Carolina. *J Phys Act Health.* 2016;13(1):59-66. doi: 10.1123/jpah.2014-0467. Epub 2015 Mar 31.
96. Sharma S, Chuang R-J, Hedberg AM. Pilot-testing CATCH early childhood: a preschool-based healthy nutrition and physical activity program. *Am J Health Educ.* 2011;42(1):12-23.
97. Friedrich RR, Polet JP, Schuch I, Wagner MB. Effect of intervention programs in schools to reduce screen time: a meta-analysis. *J Pediatr (Rio J).* 2014;90(3):232-41. doi: 10.1016/j.jped.2014.01.003. Epub 2014 Mar 7.
98. Wu L, Sun S, He Y, Jiang B. The effect of interventions targeting screen time reduction: A systematic review and meta-analysis. *Medicine.* 2016;95(27):e4029. doi: 10.1097/MD.0000000000004029.
99. Wahi G, Parkin PC, Beyene J, Uleryk EM, Birken CS. Effectiveness of interventions aimed at reducing screen time in children: a systematic review and meta-analysis of randomized controlled trials. *Arch Pediatr Adolesc Med.* 2011;165(11):979-86. doi: 10.1001/archpediatrics.2011.122. Epub 2011 Jul 4.

100. Reilly, JJ. Low levels of objectively measured physical activity in preschoolers in child care. *Med Sci Sports Exerc.* 2010 Mar;42(3):502-7. doi: 10.1249/MSS.0b013e3181cea100.
101. Woo J, Locks LM, Cheng ER, Blake-Lamb TL, Perkins ME, Taveras EM. Risk Factors for Childhood Obesity in the First 1,000 Days A Systematic Review. *Am J Prev Med.* 2016;50(6):761-79. doi: 10.1016/j.amepre.2015.11.012.
102. Bellows LL, Davies PL, Anderson J, Kennedy C. Effectiveness of a physical activity intervention for Head Start preschoolers: a randomized intervention study. *Am J Occup Ther.* 2013;67:28–36. <http://dx.doi.org/10.5014/ajot.2013.005777>.
103. Rosenthal M, Crowley A, Curry L. Family Child Care Providers' Self-perceived Role in Obesity Prevention: Working With Children, Parents, and External Influences. *J Nutr Educ Behav.* 2013;45(2):595-601.
104. Piziak V. A Pilot Study of a Pictorial Bilingual Nutrition Education Game to Improve the Consumption of Healthful Foods in a Head Start Population. *Int J Environ Res Public Health.* 2012; 9(4):1319–1325. Published online 2012 Apr 16. doi:10.3390/ijerph9041319.
105. Sharma SV, Rashid T, Ranjit N. Effectiveness of the Lunch in the Bag program on communication between the parent, child and child-care provider around fruits, vegetables and whole grain foods: A group-randomized controlled trial. *Prev Med.* 2015;81:1-8. doi: 10.1016/j.ympmed.2015.07.005. Epub 2015 Jul 17.
106. Davison KK, Jurkowski JM, Li K, Kranz S, Lawson HA. A childhood obesity intervention developed by families for families: results from a pilot study. *Int J Behav Nutr Phys Act.* 2013;10:3. doi:10.1186/1479-5868-10-3.
107. Namenek Brouwer RJ, Benjamin Neelon SE. Watch Me Grow: A garden-based pilot intervention to increase vegetable and fruit intake in preschoolers. *BMC Pub Health.* 2013;13:363. doi: 10.1186/1471-2458-13-363.
108. Joseph LS, Gorin AA, Mobley SL, Mobley AR. Impact of a Short-Term Nutrition Education Child Care Pilot Intervention on Preschool Children's Intention To Choose Healthy Snacks and Actual Snack Choices. *Child Obes.* 2015;11(5):513-20. doi: 10.1089/chi.2015.0028. Epub 2015 Aug 17.
109. Gripshover SJ, Markman EM. Teaching young children a theory of nutrition: conceptual change and the potential for increased vegetable consumption. *Psychol Sci.* 2013;24(8):1541-53. doi: 10.1177/0956797612474827. Epub 2013 Jun 26.
110. Izumi BT, Eckhardt CL, Hallman JA, Herro K, Barberis DA. Harvest for Healthy Kids Pilot Study: Associations between Exposure to a Farm-to-Preschool Intervention and Willingness to Try and Liking of Target Fruits and Vegetables among Low-Income Children in Head Start. *J Acad Nutr Diet.* 2015;115(12):2003-13. doi: 10.1016/j.jand.2015.07.020. Epub 2015 Sep 1.
111. Witt KE, Dunn C. Increasing fruit and vegetable consumption among preschoolers: Evaluation of 'Color Me Healthy'. *J Nutr Educ Behav.* 2012;44(2): 107-113.
112. Fitzgibbon ML, Stolley MR, Schiffer LA, et al. Hip-Hop to Health Jr. Obesity Prevention Effectiveness Trial: postintervention results. *Obesity.* 2011;19:994–1003.
113. The Pew Charitable Trusts. Healthier Nutrition Standards Benefit Kids: A health impact assessment of the Child and Adult Care Food Program's updated rules for meals and snacks Washington: The Pew Charitable Trusts; 2016. http://www.pewtrusts.org/-/media/assets/2017/08/kshf_healthier_nutrition_standards_benefit_kids_bia.pdf Accessed November 10, 2017.
114. Monsivais P, Kirkpatrick S, Johnson DB. More nutritious food is served in child-care homes receiving higher federal food subsidies. *J Am Diet Assoc.* 2011;111(5):721-6. doi: 10.1016/j.jada.2011.02.007.
115. Tandon PS, Zhou TC, Lozano, P, Christakis, DA. Preschoolers' Total Daily Screen Time at Home and by Type of Child Care. *J Pediatr.* 2011;158(2):297–300.
116. Middleton AE, Henderson KE, Schwartz MB. From Policy to Practice: Implementation of Water Policies in Child Care Centers in Connecticut. *J Nutr Educ Behav.* 2013;4 (2)5:119-125.
117. Erinoshio T, Ball SC, Hanson PP, Vaughn AE, Ward DS. Assessing Foods Offered to Children at Child-Care Centers Using the Healthy Eating Index-2005. *J Acad Nutr Diet.* 2013;113:1084- 1089. doi:10.1016/j.jand.2013.04.026.
118. Monsivais P, Johnson DB. Improving nutrition in home child care: are food costs a barrier? *Public Health Nutr.* 2012 Feb;15(2):370-6. doi: 10.1017/S1368980011002382. Epub 2011 Sep 29.
119. Schwartz MB, O'Connell M, Henderson KE, Middleton AE, Scarmo S. Testing variations on family-style feeding to increase whole fruit and vegetable consumption among preschoolers in child care. *Child Obes.* 2015;11(5):499-505.
120. Roe LS, Meengs JS, Birch LL, Rolls BJ. Serving a variety of vegetables and fruit as a snack increased intake in preschool children. *Am J Clin Nutr.* 2013; 98:693-9.
121. Harnack LJ, Oakes JM, French SA, Rydell SA, Farah FM, Taylor GL. Results from an experimental trial at a Head Start center to evaluate two meal service approaches to increase fruit and vegetable intake of preschool aged children. *Int J Behav Nutr Phys Act.* 2012;9:51. Published online 2012 Apr 30. doi: 10.1186/1479-5868-9-51.
122. Huss LR, Laurentz S, Fisher JO, McCabe GP, Kranz S. Timing of serving dessert but not portion size affects young children's intake at lunchtime. *Appetite.* 2013;68:158-63.
123. Kim J, Shim JE, Wiley AR, Kim K, McBride BA. Is there a difference between center and home care providers' training, perceptions, and practices related to obesity prevention? *Matern Child Health J.* 2012;16(8):1559-66. doi: 10.1007/s10995-011-0874-x.
124. Dev DA, Speirs KE, McBride BA, Donovan SM, Chapman-Novakofski K. Head Start and child care providers' motivators, barriers and facilitators to practicing family-style meal service. *Early Child Res Quart.* 2014;29:649–659; doi: 10.1016/j.ecresq.2014.07.004.

125. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States 1999-2004. *JAMA*. 2006;295:1549-55.
126. Rosner B, Cook N, Portman R, Daniels S, Falkner B. Blood Pressure differences by ethnic group among United States children and adolescents. *Hypertension*. 2009;54:502-8.
127. Fradkin C, Wallander JL, Elliott MN, Tortolero S, Cuccaro P, Schuster MA. Associations between socioeconomic status and obesity in diverse, young adolescents: variation across race/ethnicity and gender. *Health Psychol*. 2015;34(1):1-9. doi:10.1037/hea0000099.
128. Taveras ES, Gillman MW, Kleinman KP, Rich-Edwards, JW, Rifas-Shiman SL. Reducing Racial/Ethnic Disparities in Childhood Obesity: The Role of Early Life Risk Factors. *JAMA Pediatr*. 2013;167(8):10.1001/jamapediatrics.2013.85. doi:10.1001/jamapediatrics.2013.85.
129. Kumanyika, S. *Getting to equity in obesity prevention: A new framework*. Washington; 2017: National Academy of Medicine website. <https://nam.edu/wp-content/uploads/2017/01/Getting-to-Equity-in-Obesity-Prevention-A-New-Framework.pdf>. Accessed Feb 2, 2017.
130. Dietary Guidelines Advisory Committee. 2015. Scientific Report of the 2015 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Health and Human Services and the Secretary of Agriculture. Available at: <https://health.gov/dietaryguidelines/2015-scientific-report/PDFs/Scientific-Report-of-the-2015-Dietary-Guidelines-Advisory-Committee.pdf>. (Part D, Chapter 4, p. 7)

About Healthy Eating Research

Healthy Eating Research (HER) is a national program of the Robert Wood Johnson Foundation. Technical assistance and direction are provided by Duke University and the University of Minnesota School of Public Health under the direction of Mary Story, PhD, RD, program director, and Laura Klein, MPH, deputy director. HER supports research to identify, analyze, and evaluate environmental and policy strategies that can promote healthy eating among children and prevent childhood obesity. Special emphasis is given to research projects that benefit children and adolescents and their families, especially in lower-income and racial and ethnic populations at highest risk for obesity. For more information, visit www.healthyeatingresearch.org or follow HER on Twitter at [@HERResearch](https://twitter.com/HERResearch).

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