



I. Early Childhood

Studies show that approximately one in five children are overweight or obese by the time they reach their 6th birthday,⁶¹ and over half of obese children become overweight at or before age two.⁶² Even babies are affected. Between 1980 and 2001, the prevalence of overweight infants under six months almost doubled, from 3.4% to 5.9%.⁶³ More can and must be done to ensure our youngest children begin life on a healthy path.

This chapter provides recommendations for reducing the risk of obesity in the early years of a child's life by:

- strengthening prenatal care;
- promoting breastfeeding;
- evaluating the impact of chemical influences in the environment;
- reducing “screen time;” and
- improving the quality of our nation's child care settings so they can consistently support our children's healthy development.

A. Prenatal Care

Mothers' pre-conception weight and weight gain during pregnancy are two of the most important prenatal determinants of childhood obesity. Several factors may influence the association of maternal weight and weight gain during pregnancy with long-term child health outcomes. These factors include maternal and paternal BMI, maternal smoking during pregnancy, blood sugar levels during pregnancy, fetal growth, birth weight, and infant feeding practices.⁶⁴

Higher maternal weight is a risk factor for gestational diabetes or related conditions during pregnancy. Children born to mothers who had diabetes during pregnancy are at higher risk of being overweight and having gestational and type 2 diabetes. In a study of low-income children, there was a association between maternal BMI in the first trimester and the probability of being overweight at 2, 3, and 4 years of age.

Recent findings suggest that very low birth weight and very high birth weight are *both* associated with childhood obesity. Although the link between very high birth weight and childhood obesity is studied more, the link between low birth weight and obesity may be the result of accelerated growth immediately after birth. Babies who were “deprived of nutrition” before birth may be primed for accelerated growth after birth when exposed to a rich nutrient environment (which often consists of infant formula).⁶⁵ This rapid growth in the first few months and even perhaps the first days of postnatal life, are associated with increased risk of children being overweight.⁶⁶

Maternal smoking during early pregnancy is associated with a 500% greater risk of obesity at age 5, and a 260% greater risk at ages 9-10.⁶⁷ The duration of smoking while pregnant and number of cigarettes smoked per day are both associated with increases in rates of childhood obesity.⁶⁸ Maternal smoking is linked to low intrauterine growth, which can be associated with accelerated postnatal growth and childhood obesity. Notably, the recently-enacted Affordable Care Act requires coverage of counseling and pharmacotherapy for cessation of tobacco use for pregnant women in Medicaid, with no cost-sharing for these services, effective October 1.⁶⁹

To improve children's health, the Surgeon General recommends promoting effective prenatal counseling about: maternal weight gain; breastfeeding; the relationship between obesity and diabetes; and avoiding alcohol, tobacco, and drug use during pregnancy.⁷⁰ Recent clinical trials indicate that weight gain can be modified by prenatal counseling.⁷¹ Currently, however, only about 30% of pregnant women receive appropriate counseling and guidance from a medical professional on how to achieve recommended weight goals during pregnancy.⁷²

Higher maternal weight gain during pregnancy is also associated with excess maternal weight retained after childbirth.⁷³ A higher BMI after childbirth can be a health risk for the mother but also sets the stage for a higher pre-pregnancy weight in future pregnancies.

A more complete picture of maternal and child weight is needed to monitor these trends and better inform policymakers and health professionals.

Recommendations

Recommendation 1.1: Pregnant women and women planning a pregnancy should be informed of the importance of conceiving at a healthy weight and having a healthy weight gain during pregnancy, based on the relevant recommendations of the Institute of Medicine. Specifically, health care providers, as well as Federal, state, and local agencies, medical societies, and organizations that serve pregnant women or those planning pregnancies should provide information concerning the importance of conceiving at a normal BMI and having a healthy weight gain during pregnancy. Those who provide primary and prenatal care to women should offer them counseling on dietary intake and physical activity that is tailored to their life circumstances. In many cases, conceiving at a normal BMI will require some weight loss.

Text4baby: Providing Health Tips to Pregnant Women and New Parents

Text4baby, an educational program of the U.S. Department of Health and Human Services and the National Healthy Mothers, Healthy Babies Coalition, is a free mobile information service that provides pregnant women and new parents with health tips to help them give their babies the best possible start in life.

Recommendation 1.2: Education and outreach efforts about prenatal care should be enhanced through creative approaches that take into account the latest in technology and communications.

Partners in this effort could include companies that develop technology-based communications tools, as well as companies that market products and services to pregnant women or prospective parents.

Benchmarks of Success

A higher percentage of women conceiving at a normal BMI, and at an appropriate gestational weight gain during pregnancy, based on the Institute of Medicine's gestational weight guidelines.⁷⁴ To measure this, HHS should redirect existing resources to prioritize routine surveillance of weight gain during pregnancy and postpartum weight retention on a nationally representative sample of women and to report the results by pre-pregnancy BMI (including all classes of obesity), age, racial/ethnic group, and socioeconomic status.

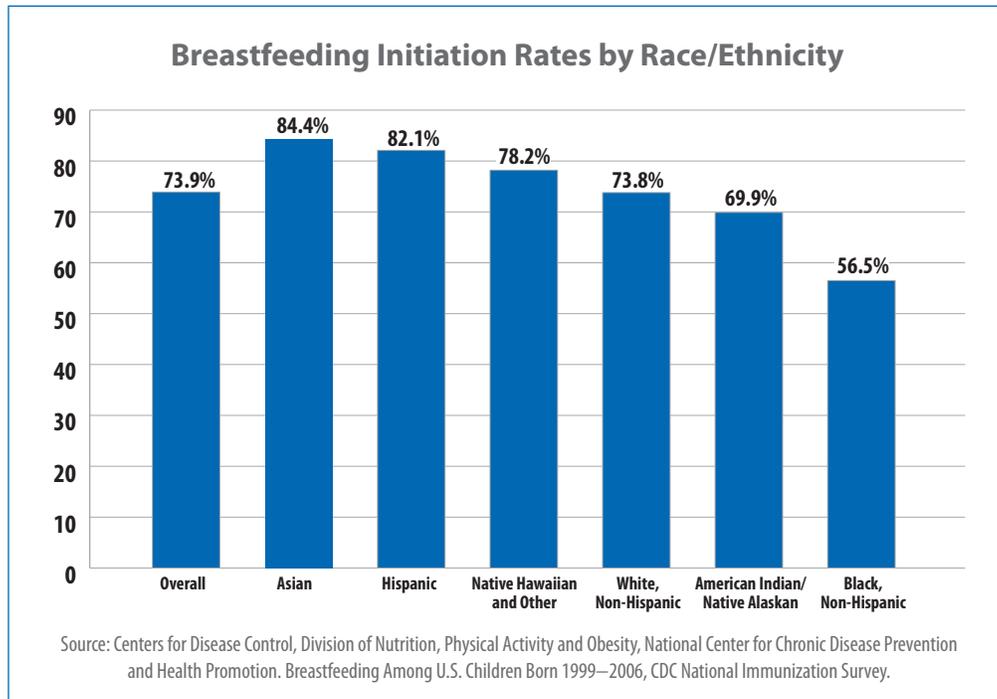
Some states also collect maternal and child weight information on birth certificates, and states should be encouraged to work with HHS to ensure that a complete set of data is collected. The 2003 version of the U.S. Standard Certificate of Live Birth includes fields for maternal pre-pregnancy weight, height, weight at delivery, and age at the last measured weight, facilitating improved public health surveillance.⁷⁵ By 2007, 24 states adopted this form, representing an estimated 60% of all births.⁷⁶ States should strive for 100% completion of fields related to maternal weight and height, as well as share data to provide a full national picture and regional snapshots. HHS should work with the remaining states to encourage adoption of the updated birth certificate form. The President's FY2011 Budget includes increased resources for all States to have an electronic birth record in 2011.

As an interim step, prenatal counseling rates can be measured as a proxy. The Pregnancy Risk Assessment Monitoring System (PRAMS) is a surveillance project of the CDC and state health departments. PRAMS collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy, including information on prenatal counseling, cigarette use, alcohol use, breastfeeding, and pre-conception health (including height and weight). PRAMS will be revised to capture prenatal counseling on appropriate weight gain.

B. Breastfeeding

Children who are breastfed are at reduced risk of obesity.⁷⁷ Studies have found that the likelihood of obesity is 22% lower among children who were breastfed.⁷⁸ The strongest effects were observed among adolescents, meaning that the obesity-reducing benefits of breastfeeding extend many years into a child's life. Another study determined that the risk of becoming overweight was reduced by 4% for each month of breastfeeding.⁷⁹ This effect plateaued after nine months of breastfeeding.

Despite these health benefits, although most (74%) babies start out breastfeeding, within three months, two-thirds (67%) have already received formula or other supplements. By six months of age, only 43% are still breastfeeding at all, and less than one quarter (23%) are breastfed at least 12 months.⁸⁰ In addition, there is a disparity between the prevalence of breastfeeding among non-Hispanic black infants and those in other racial or ethnic groups. For instance, a recent CDC study showed a difference of greater than 20 percentage points in 13 states.⁸¹



The protective effect of breastfeeding likely results from a combination of factors. First, infant formula contains nearly twice as much protein per serving as breast milk. This excess protein may stimulate insulin secretion in an unhealthy way.⁸² Second, the biological response to breast milk differs from that of formula. When feeding a baby, the mother’s milk prompts the baby’s liver to release a protein that helps regulate metabolism.⁸³ Feeding formula instead of breast milk increases the baby’s concentrations of insulin in his or her blood, prolongs insulin response,⁸⁴ and, even into childhood, is associated with unfavorable concentrations of leptin, a hormone that inhibits appetite and controls body fatness.⁸⁵ Despite the well-known health benefits of breastfeeding and the preference of most pregnant women to breastfeed,⁸⁶ numerous barriers make breastfeeding difficult. For first-time mothers, breastfeeding can be challenging, even for those who intend to breastfeed. For those who have less clear intent to breastfeed, cultural, social, or structural challenges can prevent breastfeeding initiation or continuation. For example, immediately after birth, many babies are unnecessarily given formula and separated from their mothers, making it harder to start and practice breastfeeding. Also, hospital staff are often insufficiently trained in breastfeeding support.

The Joint Commission on the Accreditation of Hospitals, the body that accredits hospitals and health care organizations for most State Medicaid and Medicare reimbursement, now expects hospitals to track and improve their rates of exclusive breastfeeding. Hospitals that meet specific criteria for optimal breastfeeding-related maternity care are designated as “Baby Friendly” by Baby-Friendly U.S.A. This non-governmental organization has been named by the U.S. Committee for UNICEF as the designating authority for UNICEF/WHO standards in the United States. Currently only 3% of births in America occur in Baby-Friendly facilities.⁸⁷

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While breastfeeding could be far more widespread than it is today, it is not a viable alternative for all mothers and babies. Specific guidance and support options should also be made available for those who cannot breastfeed. Parents and caregivers of babies also may benefit from guidance about when to start feeding them solid foods, since early introduction of solids (prior to six months) increases the risk for childhood obesity.⁸⁸

Workplace and Child Care Accommodations

Research has demonstrated that support is essential for helping mothers establish and continue breastfeeding as they return to work or school and make use of child care services.⁸⁹ Many women return to work soon after their baby's birth, yet 75% of employers do not offer accommodations for them to breastfeed or express milk at work.⁹⁰

Changes are underway, however. Following the lead of states whose laws requiring employers to make accommodations, the recently-enacted Affordable Care Act requires employers to provide a reasonable break time and a place for breastfeeding mothers to express milk for one year after their child's birth.⁹¹ Employers with fewer than 50 employees are not subject to these requirements if compliance would impose an undue hardship. The location cannot be a bathroom, and must be shielded from view and free from intrusion from co-workers and the public. The return on investment of companies that assist breastfeeding employees through appropriate support and accommodations is well-documented. Companies benefit through better employee retention, lower health care costs, and better work attendance.⁹²

Support for breastfeeding in child care settings is important as well. Among women whose infants are cared for outside the home, irrespective of their intent to breastfeed, those who report better support for breastfeeding from early learning settings (such as refrigerated storage for breast milk, a commitment to feed it to the child, or privacy space for on-site breastfeeding) are more likely to breastfeed longer.⁹³

Support Programs

In many communities, role models for breastfeeding are rare, and new mothers do not know where to turn for breastfeeding assistance. Volunteer networks of experienced breastfeeding mothers such as the La Leche League provide help for some mothers, but networks like this are not available in many communities. According to the CDC's annual State Breastfeeding Report Card, there were 34 breastfeeding support groups per 100,000 live births in 2009, which means about one support group for every 3000 new babies. Peer support programs, such as the Peer Counselor program delivered as part of the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), provide counseling skills, training, and support to experienced breastfeeding mothers so they can effectively support new mothers. Recently, federal funds were provided to further expand the availability of peer counseling in local WIC clinics. Prenatal counseling on breastfeeding can also have positive impacts on breastfeeding rates,⁹⁴ and pre- and postnatal intervention together with peer counseling is most effective.⁹⁵

Recommendations

Recommendation 1.3: Hospitals and health care providers should use maternity care practices that empower new mothers to breastfeed, such as the Baby-Friendly hospital standards. Hospitals and health care providers should routinely provide evidence-based maternity care that empowers parents to make informed infant feeding decisions as active participants in their care, and improves new mothers' ability to breastfeed successfully. Examples of specific practices and policies include: skin-to-skin contact between the mother and her baby; teaching mothers how to breastfeed; and early and frequent breastfeeding opportunities.

Hospitals, health care providers, and health insurers should also help ensure that new mothers receive proper information and support on breastfeeding when they are released from the hospital.

Recommendation 1.4: Health care providers and insurance companies should provide information to pregnant women and new mothers on breastfeeding, including the availability of educational classes, and connect pregnant women and new mothers to breastfeeding support programs to help them make an informed infant feeding decision.

Recommendation 1.5: Local health departments and community-based organizations, working with health care providers, insurance companies, and others should develop peer support programs that empower pregnant women and mothers to get the help and support they need from other mothers who have breastfed. Peer support networks should exist in all communities across the country, allowing all new mothers to easily identify and obtain help from trained breastfeeding peer counselors. Community organizations can foster the creation of peer support networks through expansion of programs like the WIC Breastfeeding Peer Counseling program. They can work with local breastfeeding coalitions to ensure existence of other peer support networks, such as La Leche League groups or Nursing Mothers Councils. They can also foster the creation of mother-to-mother support groups in community health centers and advertise these groups, particularly as part of the hospital discharge process.

Early Head Start (EHS) programs that enroll pregnant women, including pregnant teenagers, can also support community breastfeeding networks. EHS can provide home visits and reach out to pregnant and breastfeeding mothers to encourage and support breastfeeding, including by providing professional and peer opportunities to disseminate information and provide on-going support. Funding for evidence-based home visitation programs in the recently-enacted Affordable Care Act⁹⁶ will complement this program.

Private companies, including those that market baby products, can also help support and promote these types of community supports for mothers.

Recommendation 1.6: Early childhood settings should support breastfeeding. Child care centers and providers, health care providers, and government agencies should provide accurate information about the storage and handling of breast milk. They should also make sure child care employees and providers know how to store, handle, and feed breast milk, and understand the importance of breastfeeding.

Benchmarks of Success

An increase in breastfeeding rates. Several government sources provide statistics on breastfeeding rates. The most comprehensive source of information is the National Immunization Survey, which provides annual national, state, and selected urban-area estimates of breastfeeding initiation, duration, and exclusivity. In addition to questions on breastfeeding, the survey asks about the introduction of infant formula and other supplementary foods. As noted above, according to the survey, currently 30% of babies age nine months or younger are breastfed. This should increase by 5% every two years, so that by 2015, half of babies are breastfed for at least nine months.

C. Chemical Exposures

In addition to fetal “over-nutrition” or “under-nutrition,” it is possible that developmental exposure to endocrine disrupting chemicals (EDCs) or other chemicals plays a role in the development of diabetes and childhood obesity. Some scientists have coined the term “obesogens” for chemicals that they believe may promote weight gain and obesity. Such chemicals may promote obesity by increasing the number of fat cells, changing the amount of calories burned at rest, altering energy balance, and altering the body’s mechanisms for appetite and satiety. Fetal and infant exposure to such chemicals may result in more weight gain per food consumed and also possibly less weight loss per amount of energy expended. The health effects of these chemicals during fetal and infant development may persist throughout life, long after the exposures occur.⁹⁷

Research on such chemicals suggests that the origins of obesity may lie not only in well-established risk factors such as diet and exercise, but also in the interplay between genes and the fetal and early postnatal environment. The National Institute of Environmental Health Sciences, the Environmental Protection Agency (EPA), and other research organizations have been working to understand the developmental origins of obesity and other diseases. Their activities have helped reveal the links between environmental chemicals and obesity and diabetes, providing a sufficient base of evidence to warrant future research efforts in this area.

This issue could also be investigated further by the President’s Task Force on Environmental Health Risks and Safety Risks to Children, led by HHS and EPA. An increased understanding of chemical toxicity also adds strength to the existing recommendations for parents to avoid microwaving baby bottles or plastic containers that are not explicitly stated by the manufacturer as safe for use in microwaving.⁹⁸ Government should work closely with industries to translate this emerging science into programs that supports product reformulation (for example, of plastic containers) as appropriate.

Recommendations

Recommendation 1.7: Federal and State agencies conducting health research should prioritize research into the effects of possibly obesogenic chemicals. As the research becomes clearer, reducing harmful exposures may require outreach to communities and medical providers, and could also entail regulatory action.

Benchmarks of Success

A stronger knowledge of chemical exposures that may be related to obesity. Emerging research will guide the direction of future intervention strategies for which progress metrics can then be developed. The necessary research will control the timeline for at least the first 4-5 years. After that time, while research efforts will continue, there may be sufficient information to develop strategies to eliminate exposures identified as obesogenic.

D. Screen Time

The American Academy of Pediatrics (AAP) recommends that children two years old and under should not be exposed to television, and children over age two should limit daily media exposure to only 1-2 hours of quality programming.⁹⁹ In contrast to these recommendations, one study found that 43% of children under age two watch television daily, and 26% have a television in their room.¹⁰⁰

Preschool aged children are also watching more television than recommended by the AAP. Ninety percent of children ages 4-6 use screen media for an average of two hours per day. Over 40% of children in this age group have a television in their bedroom, a third have a portable DVD player, and a third have a portable handheld video game player. Children from lower income families and children of color spend more time watching television and are more likely to live in a home where it is left on most of the time.¹⁰¹

Studies show an association between television viewing and risk of being overweight in preschool children, independent of socio-demographic factors. Specifically, for each additional hour of television viewing, the odds ratio of children having a BMI greater than the 85th percentile was 1.06.¹⁰² Having a television in the bedroom had a stronger association, with an odds ratio of 1.31. One study noted that preschool children who watched television for more than two hours a day were more likely to be overweight than children who watched television two hours or less daily.¹⁰³

Television viewing is also linked to dietary intake. Another study found that television exposure was correlated with fast-food consumption in preschool children, even after adjusting for a variety of socio-demographic and socio-environmental factors.¹⁰⁴

Recommendations

Recommendation 1.8: The AAP guidelines on screen time should be made more available to parents, and young children should be encouraged to spend less time using digital media and more time being physically active. Health care provider visits and meetings with teachers and early learning providers are an opportunity to give guidance and information to parents and their children.

Recommendation 1.9: The AAP guidelines on screen time should be made more available in early childhood settings. Early childhood settings should be encouraged to adopt standards consistent with AAP recommendations not to expose children two years of age and under to television, as well as to limit media exposure for older children by treating it as a special occasion activity rather than a daily event.

E. Early Care and Education

More than 3.5 million children under age five are cared for in child care centers, and many more are cared for through less formal arrangements while a parent works.¹⁰⁵ Children in child care centers spent an average of 33 hours a week in those settings.¹⁰⁶ Parents and child care providers are sharing the responsibility for a large and growing number of children during important developmental years. Early childhood settings, including both child care centers and informal care, present a tremendous opportunity to prevent obesity by making an impact at a pivotal phase in children's lives.

Physical Activity

Young children need opportunities to be physically active through play and other activities. Physical activity assists children in obtaining and improving fine and gross motor skill development, coordination, balance and control, hand-eye coordination, strength, dexterity, and flexibility—all of which are necessary for children to reach developmental milestones.

Preschool years, in particular, are crucial for obesity prevention due to the timing of the development of fat tissue, which typically occurs from ages 3-7. During these preschool years, children's BMI typically reaches its lowest point and then increases gradually through adolescence and most of adulthood. However, if this BMI increase begins before ages 4 to 6, research has suggested that children face a greater risk of obesity in adulthood.¹⁰⁷

Features of the child care center environment, including policies regarding activity and provider training, as well as the presence of portable and fixed play equipment, influence the amount of physical activity children engage in while at child care.¹⁰⁸

Healthy Eating

Eating well is equally important for the healthy development of young children, and research has shown that public programs can improve the nutritional quality of the food consumed in child care settings. Children in early childhood settings who are served by USDA's Child and Adult Care Food Program (CACFP) eat healthier food than children who bring meals and snacks from home.¹⁰⁹ A comparison of meal quality among licensed early learning sites in California found that children eating meals provided in Head Start had the highest meal quality scores, followed by those eating in non-Head Start under CACFP. Meal quality scores were higher among center-based versus home-based facilities.¹¹⁰

Many programs have already seized the opportunity to provide healthier foods and have implemented evidence-informed initiatives that encourage healthy eating and fun, developmentally-appropriate physical activity. Still, there is room for improvement.¹¹¹ Empirically-based and practice-tested strategies for improving these settings have been identified and provide a basis for the recommendations outlined in this chapter. Through concerted and coordinated effort at the Federal, state, and local levels, today's early learning settings can support healthy weight through the development of good habits for nutrition, physical activity, and screen time.

Each state creates and enforces its own child care licensing standards, as well as other program standards for center-based and family child care homes. Not all child care facilities are required to be licensed in

order to legally operate within a state, but they must meet some basic requirements. A recent review of state child care regulations by researchers at the Duke University School of Medicine, based on ten expert-derived healthy eating model regulations, found that states had an average of 3.7 healthy eating regulations for child care centers and 2.9 for family child care homes. No state had all ten model regulations. States had particularly few regulations relating to physical activity and screen time.¹¹²

Workforce qualifications and training requirements for child care providers also vary widely from state to state. Many states are now implementing Professional Development Registries and other methods to better track and document the providers' training sessions. They are also implementing observation and feedback opportunities to understand if training is being applied in the classroom. To incorporate recommended nutrition, physical activity, and screen standards into their curricula, Federal agencies and states can partner with national organizations such as the National Association of Child Care Resource and Referral Agencies (NACCRRA), the National Association for the Education of Young Children (NAEYC), and the National Head Start Association (NHSA), as well as community colleges and other training providers.

Parents are often unaware of quality elements when choosing child care and early education settings, including the importance of nutrition, physical activity, and screen time limits provided in these settings, and they can find it difficult to get this information. Quality Rating and Improvement Systems (QRISs) are State systems that rate the quality of early child care settings (which can include Pre-K, Head Start, child care, and others) based on a clear, common set of criteria. These rating systems can provide parents with reliable, consistent information that can help them make informed decisions.

Innovative Early Childhood Programs

There are several evidence-informed initiatives and interventions for early childhood settings to combat childhood obesity, including:

- *I am Moving, I am Learning*, a proactive approach to childhood obesity in preschool classrooms that seeks to increase moderate to vigorous physical activity every day, improve the quality of movement activities intentionally planned and facilitated by adults, and promote healthy food choices. This approach is implemented by Head Start and has been adopted by some other child care programs as well.
- *Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC)*, an assessment tool for child care settings, which uses an organizational assessment of 14 areas of nutrition and physical activity policy, practices and environments to identify the strengths and limitations of the child care facility. NAP SACC also includes goal setting and action planning, continuing education and skill building for providers.
- *Nemours Program*: Delaware, under the leadership of Nemours, an integrated child health system, launched a statewide, multi-sector program to combat childhood obesity that includes changes in child care licensing to set healthy eating and physical activity standards, along with technical assistance, training and practical toolkits to help providers implement the standards. The new standards apply to all licensed center and family day care providers, impacting 54,000 children.

Recommendations

Recommendation 1.10: The Federal government, incorporating input from health care providers and other stakeholders, should provide clear, actionable guidance to states, providers, and families on how to increase physical activity, improve nutrition, and reduce screen time in early child care settings.

Recommendation 1.11: States should be encouraged to strengthen licensing standards and Quality Rating and Improvement Systems to support good program practices regarding nutrition, physical activity, and screen time in early education and child care settings.

Both federal guidance and state policies and practices may be drawn from:

- The guidelines for Out-of-Home Child Care Programs that will be outlined in the soon-to-be released third edition of *Caring for our Children: National Health and Safety Performance Standards*.¹¹³ These nationally recognized standards include health and safety practices such as physical activity, nutrition, and limited screen time for children from birth to age 12 in all types of early childhood settings.
- The National Association for Sport and Physical Education (NASPE) recommendation that all children in full-day child care are provided at least 60 minutes of structured and unstructured physical activity per day. Others have recommended that infants be provided opportunities for gross motor activity, and should not be unnecessarily confined.
- The revised Head Start Program Performance Standards, which include recommendations for health, nutrition, and physical environments.

Recommendation 1.12: The Federal government should look for opportunities in all early childhood programs it funds (such as the Child and Adult Care Food Program at USDA, the Child Care and Development Block Grant, Head Start, military child care, and Federal employee child care) to base policies and practices on current scientific evidence related to child nutrition and physical activity, and seek to improve access to these programs.

Benchmarks of Success

An increased number of states will adopt more stringent licensing standards that include nutrition, physical activity, and screen time that align with *Caring for our Children: National Health and Safety Performance Standards, 3rd edition* and coordinate across systems with Pre-K, Head Start, and child care. New or enhanced data sources may be needed to monitor progress in this area.

