

Childhood Overweight and Obesity: Data Brief

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Summary

In children and adolescents, obesity is defined as being at or above the 95th percentile of the age- and sex-specific body mass index (BMI); overweight is defined as being between the 85th and 94th percentiles, based on growth charts developed by the Centers for Disease Control and Prevention. Over the past three decades, obesity has become a major public health problem, capturing the interest of health care professionals, policymakers, schools, employers, and the media. Although obesity rates have stabilized over the past decade, almost 32% of U.S. children and adolescents between the ages of 2 and 19 are overweight, and more than half of those children are considered obese.

The prevalence of overweight and obesity in children varies by age, race, ethnicity, geographic location, and socioeconomic status. In 2011-2012, 18% of 6- to 11-year-olds and 21% of 12- to 19-year-olds were obese. The only age group reported to experience decreases in obesity rates were two- to five-year-olds, where obesity prevalence fell from 13.9% in 2003-2004 to 8.4% in 2011-2012. Overweight and obesity are more prevalent among certain minority groups and low-income children. Additionally, states with the highest child and adolescent obesity rates are concentrated in the southeastern region of the United States. Studies suggest that several factors may contribute to obesity, including behavioral factors such as energy intake (i.e., calories consumed) and physical activity, as well as familial, cultural, and socioeconomic factors.

In recent years, Congress has sought to address this issue through legislation that promotes nutrition, healthy weight, and fitness, particularly in communities, schools, and federal nutrition programs. For example, the 2010 Healthy, Hunger-Free Kids Act (P.L. 111-296) addresses several nutrition-related concerns through various child nutrition programs, including the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). A provision in the Patient Protection and Affordable Care Act (P.L. 111-148) funds a demonstration program for a comprehensive approach to childhood obesity in Children's Health Insurance Program (CHIP) participants. Other proposed policies include support of research and implementation of best practices in both federal and community programs, as well as increased monitoring of BMI by health care providers and schools.

Congress and the Obama Administration have shown a strong interest in tracking childhood obesity data, and in developing policies to reverse the trend of increasing obesity rates. Federal policies to address childhood obesity span many departments, including the Departments of Health and Human Services (HHS), Education, and Agriculture, among others. Reducing childhood obesity is also a major initiative of First Lady Michelle Obama and the Secretary of Health and Human Services. In May 2010, the President's Task Force on Childhood Obesity released an action plan with a series of recommendations to reduce childhood obesity prevalence from 17% in 2007-2008 to 5% by 2030. HHS has modified *Healthy People 2020* goals (which track health objectives for the nation and progress toward those goals) to seek a 10% reduction in childhood obesity over the next 10 years.

This report provides an overview of the data being used to inform federal obesity policy. It presents an overview of obesity statistics among children and adolescents, and includes a discussion of obesity measurement, trends in obesity rates, and differences that exist across gender, race, ethnicity, socioeconomic status, and geographic location.

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Introduction

Over the past three decades, obesity rates have more than doubled among adults, and tripled among children and adolescents. In 2011-2012, about 32% of U.S. children and adolescents between the ages of 2 and 19 years old were overweight, and more than half of those children were considered obese.¹ Recent data suggest that obesity rates are stabilizing, but prevalence remains high, and obesity as a public health issue has gained the attention of health care professionals, policymakers, schools, employers, and the media. Obesity increases mortality risk and is associated with a number of chronic conditions in children, such as diabetes, asthma, and risk factors for heart disease.² Obese children are at a greater risk for obesity and other chronic conditions in adulthood.³ Some researchers believe that today's children may lead shorter lives than their parents due to the negative effects of obesity.⁴ In addition to those risks, obesity rates in children and adolescents have raised concerns about increased burden on the health care system and the effects of obesity on military readiness.⁵

Overweight and obesity often begin in childhood and adolescence and continue into adulthood. Adults are generally considered capable of understanding how to maintain a healthy weight, and are considered capable of making personal choices, when possible, to control their weight. However, children may not have the tools or capacity to understand or prevent overweight and obesity, and the government often has a larger influence on their well-being, through schools, health care, and programs for low-income families.

The Obama Administration has shown a strong interest in developing policies to address childhood overweight and obesity. Childhood obesity is a major initiative of First Lady Michelle Obama, the Department of Health and Human Services (HHS), and the Department of Agriculture (USDA). The 2010 Dietary Guidelines for Americans (DGA), the White House Task Force on Childhood Obesity Report, and the Let's Move initiative have focused research and policy attention on improving the health of American children, especially in terms of weight status.⁶ The President's Task Force on Childhood Obesity released an action plan with a series of recommendations to reduce childhood obesity to 5% by 2030.⁷ *Healthy People 2020* objectives aim for a 10% reduction, from 16.1% in 2005-2008 to 14.6% by 2020, and an increase in access

¹ C Ogden, M Carroll, B Kit et al., "Prevalence of Childhood and Adult Obesity in the United States, 2011-2012," *JAMA*, vol. 311, no. 8 (February 26, 2014), pp. 806-814.

² W Dietz, "Health Consequences of Obesity in Youth: Childhood Predictors of Adult Disease," *Pediatrics*, vol. 101 (1998), pp. 518-525.

³ American Academy of Pediatrics, Committee on Nutrition. "Prevention of Pediatric Overweight and Obesity," *Pediatrics*, vol. 112, no. 2 (August 2003), pp. 424-430.

⁴ S Stewart, D Cutler and A Rosen, "Forecasting the Effects of Obesity and Smoking on U.S. Life Expectancy," *New England Journal of Medicine*, vol. 361, no. 23 (December 3, 2009), pp. 2252-2260.

⁵ E Finkelstein, J Trogdon, J Cohen et al., "Annual Medical Spending Attributable to Obesity: Payer and Service-Specific Estimates," *Health Affairs*, vol. 28, no. 5 (2009), pp. w822-w931. Mission: Readiness, Military Leaders for Kids. *Too Fat to Fight: Retired Military Leaders Want Junk Food out of America's Schools*, Mission Readiness, New York, 2014.

⁶ *White House Task Force on Childhood Obesity Report to the President*, Washington, DC, February 2011, <http://www.letsmove.gov/white-house-task-force-childhood-obesity-report-president>.

⁷ White House Task Force on Childhood Obesity, *Solving the Problem of Childhood Obesity Within a Generation*, Report to the President, Washington, DC, May 2010, http://www.letsmove.gov/pdf/TaskForce_on_Childhood_Obesity_May2010_FullReport.pdf.

to and consumption of nutritious foods.⁸ In some instances, activities are conducted subject to Congress's funding decisions in annual appropriations bills.

In recent years, Congress has considered many approaches to these issues, including increased funding for school lunch programs, updating school meal nutrition standards, encouraging “farm-to-school” activities, and broadened coverage and support for school wellness programs.⁹ Many of these issues were addressed in the Healthy, Hunger-Free Kids Act (P.L. 111-296), which is discussed in greater detail in CRS Report R41354, *Child Nutrition and WIC Reauthorization: P.L. 111-296*. The Patient Protection and Affordable Care Act (P.L. 111-148) appropriated \$25 million for a Childhood Obesity Research Demonstration (CORD) project that was authorized in the 2009 CHIP reauthorization (P.L. 111-3). Funded through September 2015, CORD provides funding for the development of a comprehensive and systematic model for reducing childhood obesity, through targeted support to families, the identification of behavioral risk factors, identification of needed clinical preventive, screening benefits, and medical assistance.

Other approaches have addressed collection of program participant data on student fitness levels, nutrition behavior, and physical activity, in addition to higher physical education standards and required activity time in schools and child care settings. Additionally, Congress has expressed interest in coordination of these activities with private sector efforts. Some have suggested requirements for local education agencies to integrate fitness into the school environment and to disseminate information on physical activity to families. Others have called for nationwide physical education requirements in schools, which are currently determined at the local level. Programs such as Communities Putting Prevention to Work (CPPW) seek to address environmental determinants of obesity through initiatives that include increasing the availability of healthy food and beverages in schools, supporting development of sidewalks and bike lanes, and working with afterschool programs to implement physical activity requirements.¹⁰

Congress has at times required the collection of participant data, either to establish or compare to national benchmarks, to examine trends over time, or to evaluate programs. This report presents data on obesity among children and adolescents, and includes a discussion of obesity measurement, trends in obesity rates, and differences in rates that exist across gender, race, ethnicity, socioeconomic status, and geographic location.

Measurement of Childhood Overweight and Obesity

According to the Centers for Disease Control and Prevention (CDC), obesity and overweight are terms used to describe ranges of weight that are higher than what is generally considered healthy for a given height.¹¹ While several methods are available to measure or estimate overweight and obesity, this report relies on the use of BMI to present the data on childhood overweight and

⁸ *Healthy People 2020*, published by HHS, provides science-based, 10-year health objectives for the nation. Department of Health and Human Services, *Healthy People 2020*, <http://www.healthypeople.gov/2020/default.aspx>

⁹ CRS Report R41354, *Child Nutrition and WIC Reauthorization: P.L. 111-296*.

¹⁰ <http://www.cdc.gov/nccdphp/dch/programs/communitiesputtingpreventiontowork/program/obesity.htm>

¹¹ CDC, *Defining Overweight and Obesity*, <http://www.cdc.gov/obesity/defining.html>.

obesity. While BMI is not an exact measure of body fat, as discussed below, it is regarded as an efficient measure of childhood overweight and obesity for population-based data. BMI is presented as the indicator of overweight and obesity in most federally sponsored studies and reports of children's health, including the National Health and Nutrition Examination Survey (NHANES) and *Healthy People 2020*. BMI is also the most commonly used clinical screening measure for both child and adult overweight and obesity, and is recommended by the U.S. Preventive Services Task Force (USPSTF) for screening purposes.¹²

Measurement

One aspect of the discussion surrounding childhood overweight and obesity is the issue of measurement. Body mass index (BMI), a number calculated from a person's weight and height, is commonly used to screen for obesity. BMI is considered a reliable, easy, and inexpensive way to screen individuals over age two for possible weight problems.¹³ In addition to its use in research and surveillance, BMI is widely used in clinical settings. BMI is not a direct measure of body fat, but research has shown that BMI correlates with direct measures of body fat.¹⁴ BMI is used as a rapid and inexpensive screening tool; however, not all children with a high BMI are overweight or obese. Some children may be heavier due to extra muscle mass, not extra body fat. The CDC recommends that a child with a high BMI be examined by a health care provider to determine if overweight or obesity is a concern.

BMI percentiles are determined using population-based growth charts developed by CDC that show age- and sex-specific BMI. These charts were created using reference populations from several surveys administered by CDC between 1963 and 1994.¹⁵ Consequently, when using BMI as an indicator of overweight and obesity today, the measure is referring to the BMI index levels of individuals based on their age, sex, weight, and height compared to their respective reference populations' BMI distributions from which the index was developed. In children, obesity is defined as being at or above the 95th percentile of the age- and sex-specific BMI *relative to those reference populations*; overweight, also known as "at risk for obesity," is defined as being between the 85th and 94th percentiles.¹⁶ In most children and adolescents, a BMI level at or above the 95th percentile indicates elevated body fat and reflects the presence or risk of related chronic disease. The most

Classification for Child and Adolescent Overweight and Obesity Using 2000 CDC Growth Charts

85 th -94 th percentile	Overweight
≥95 th percentile	Obese

¹² U.S. Preventive Services Task Force. "Screening for Obesity in Children and Adolescents: U.S. Preventive Services Task Force Recommendation Statement," *Pediatrics*, vol. 125 (2010), pp. 361-367.

¹³ A quick assessment of child and teen BMI can be found online at <http://apps.nccd.cdc.gov/dnpabmi/>.

¹⁴ Z Mei, L Grummer-Strawn, A Pietrobelli et al., "Validity of Body Mass Index Compared with Other Body-Composition Screening Indexes for the Assessment of Body Fatness in Children and Adolescents," *American Journal of Clinical Nutrition*, vol. 75, no. 6 (June 2002), pp. 978-985.

¹⁵ C Ogden, R Kuczmarski, K Flegal et al., "Centers for Disease Control and Prevention 2000 Growth Charts for the United States: Improvements to the 1977 National Center for Health Statistics Version," *Pediatrics*, vol. 109 (2002), pp. 45-60.

¹⁶ In the past, children at the 85th percentile were considered "at-risk for overweight," and those at the 95th percentile were considered "overweight." An American Medical Association (AMA) expert panel recommended a change in terminology in 2007 to "overweight" for children at or above the 85th percentile and "obese" for children at or above the 95th percentile, respectively. CDC and NCHS have adopted this terminology, based on the AMA panel's recommendation.

recent NHANES data, including those corresponding to a higher cut point ($\geq 97^{\text{th}}$ percentile), are presented in **Appendix B**. Generally, children in the higher BMI percentile groups are at greater risk for metabolic complications (e.g., type 2 diabetes) and are more likely to become obese as adults. Because the CDC growth chart data is based on a “preobesity epidemic population,” there is insufficient data to construct percentiles beyond the 97^{th} percentile, and CDC BMI growth charts cannot be used to characterize severely obese children and adolescents.¹⁷

Data Sources

Child health data are available from several sources, but the types of data and resulting analyses vary. This report presents data from several sources, including the National Health and Nutrition Examination Survey (NHANES), the Youth Risk Behavior Surveillance System (YRBSS), and the National Survey of Children’s Health (NSCH). The Pediatric Nutrition Surveillance System (PedNSS) has been used to monitor the nutritional status of low-income children in federally funded programs from birth through age five, but was discontinued in 2012. All data used in this report are collected by HHS with the intent to monitor the nation’s health. Each data source is described below, followed by a general discussion of the strengths and weaknesses of the data collected by each system. For a more detailed comparison of the data sources, see **Appendix A**.

The **National Health and Nutrition Examination Survey** is a continuous national survey that uses mobile examination centers to conduct in-person interviews, physical examinations, diagnostic tests, and nutritional assessments on a nationally representative sample of about 5,000 people of all ages annually. BMI is calculated from direct measure of height and weight by survey staff. These data are available from 1976 to the present. Because the sample size is relatively small, state-level data for children and adolescents are not available from NHANES.¹⁸

The **Youth Risk Behavior Surveillance System** is composed of national, state, and local school-based surveys of students in grades 9 through 12. It is designed to monitor six categories of health-risk behaviors, including physical activity and dietary habits, in this age group. Participation is voluntary, and students are asked to complete the questionnaire during one class period. In 2013, approximately 13,500 students participated in YRBSS. Since 1991, the survey has been administered once every two years, and it is designed to be nationally representative of all U.S. students in grades 9 through 12. BMI is calculated based on the responses to questions about age, gender, height, and weight. The sample size is large enough to present state-level data, and data are often available from states, as well as from CDC.¹⁹

The **National Survey of Children’s Health** is a national telephone survey administered by the Maternal and Child Health Bureau (MCHB) of the Health Services and Resource Administration (HRSA) that is conducted every four years. This survey collects a broad range of information on children’s health and well-being, and includes information on the family environment. NSCH data are collected in English and Spanish in a manner that allows for valid state and national level comparisons. In 2011-2012, surveys were completed for 95,677 children and adolescents from

¹⁷ A Gulati, D Kaplan, and S Daniels, “Clinical Tracking of Severely Obese Children: A New Growth Chart,” *Pediatrics*, vol. 130, no. 6 (December 2012).

¹⁸ CDC National Center for Health Statistics, *About the National Health and Nutrition Examination Survey*, Hyattsville, MD, http://www.cdc.gov/nchs/nhanes/about_nhanes.htm.

¹⁹ CDC, *Morbidity and Mortality Weekly Report, Youth Risk Behavior Surveillance—2013*, Atlanta, GA, June 13, 2014, <http://www.cdc.gov/mmwr/pdf/ss/ss6304.pdf>.

birth to age 17.²⁰ BMI calculations are based on parent report of gender, age, weight, and height for children ages two and up.

Choosing a Data Source

Estimates of obesity from each data source are different, due to the methods used to collect the data, and coverage, or population base, of the survey or surveillance system. Each data source provides a unique view of childhood obesity, and each has its strengths and weaknesses. When interpreting the data, policymakers may consider the following key points: (1) Are the data self-reported, or measured directly? (2) Are the data reliable at the state level, national level, or both? (3) Is there any additional information collected that would provide a social context for the data?

NHANES is widely considered the most reliable national estimate, due to the use of direct measurement of participants, but it cannot be used for state-level estimates due to its sample size. YRBSS and NSCH are based on self- or parent-report of height and weight, which has been shown to underestimate BMI.²¹ However, these two surveys have large sample sizes and can be analyzed at the state level. Additionally, NSCH collects data on a large number of family and household characteristics, which can be used to characterize the household environment of obese and overweight children. YRBSS collects risk behavior information, which allows researchers and public health professionals to identify behaviors in adolescents that may contribute to obesity. In this report, NHANES is used to present national data, and NSCH is used to present state-level estimates.

Prevalence of Childhood Overweight and Obesity

The increase in childhood overweight and obesity has affected certain subsets of the population more than others. For instance, between 2003-2004 and 2011-2012, there was no significant change in obesity prevalence overall, but there was a significant decrease in obesity prevalence among children two to five years old. This section includes information on the increase in childhood overweight and obesity among specific age groups, gender, race, ethnicity, and geography.

Variation by Age Group

Based on analysis of the most recent NHANES data, almost 32% of U.S. children between 2 and 19 years of age are overweight, and more than half of those children are considered obese. Obesity prevalence varies by age group: 8% of children 2 to 5 years of age are obese, compared with almost 18% of children 6 to 11 years and 21% of children 12 to 19 years.²²

²⁰ Child and Adolescent Health Measurement Initiative, “2011/12 National Survey of Children’s Health (2012), Sampling and Survey Administration,” Data Resource Center, HHS, HRSA, MCHB, <http://childhealthdata.org/docs/drc/2011-12-nsch-sampling-and-administration.pdf>.

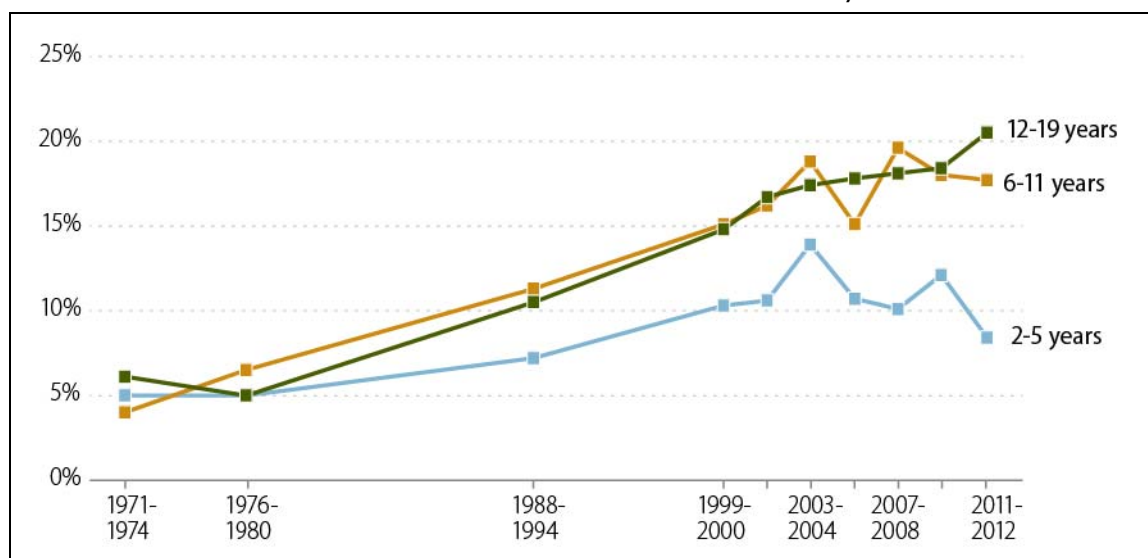
²¹ M Ezzati, H Martin, S Skjold, et al., “Trends in National and State-level Obesity in the USA after Correction for Self-Report Bias: Analysis of Health Surveys,” *Journal of the Royal Society of Medicine*, vol. 99, no. 6 (June 2006), pp. 250-257.

²² C Ogden, M Carroll, and B Kit et al., “Prevalence of Childhood and Adult Obesity in the United States, 2011-2012,” *JAMA*, vol. 311, no. 8 (February 26, 2014), pp. 806-814.

In recent years, obesity prevalence rates among children and adolescents 2 to 19 years old have stabilized, and there has been a significant decrease in obesity prevalence among children two to five years old from 13.9% in 2003-2004 to 8.4% in 2011-2012.²³ **Figure 1** shows obesity trends by age group.

Figure 1. Trends in Obesity Among Children and Adolescents, 1971-2012

National Health and Nutrition Examination Survey



Source: C Fryar, M Carroll, and C Ogden, "Prevalence of Overweight and Obesity among Children and Adolescents: United States, 1963-1965, through 2011-2012," NCHS Health E-Stat: http://www.cdc.gov/nchs/data/hestat/obesity_child_11_12/obesity_child_11_12.htm.

Notes: CRS did not find any literature to explain the 2003-2004 increase and subsequent decline in 2005-2006 among children 2 to 5 and 6 to 11 years old. CRS speculates, however, that it may be attributable to fluctuations in BMI in the study sample, rather than the overall population

Variation by Gender, Race, and Ethnicity

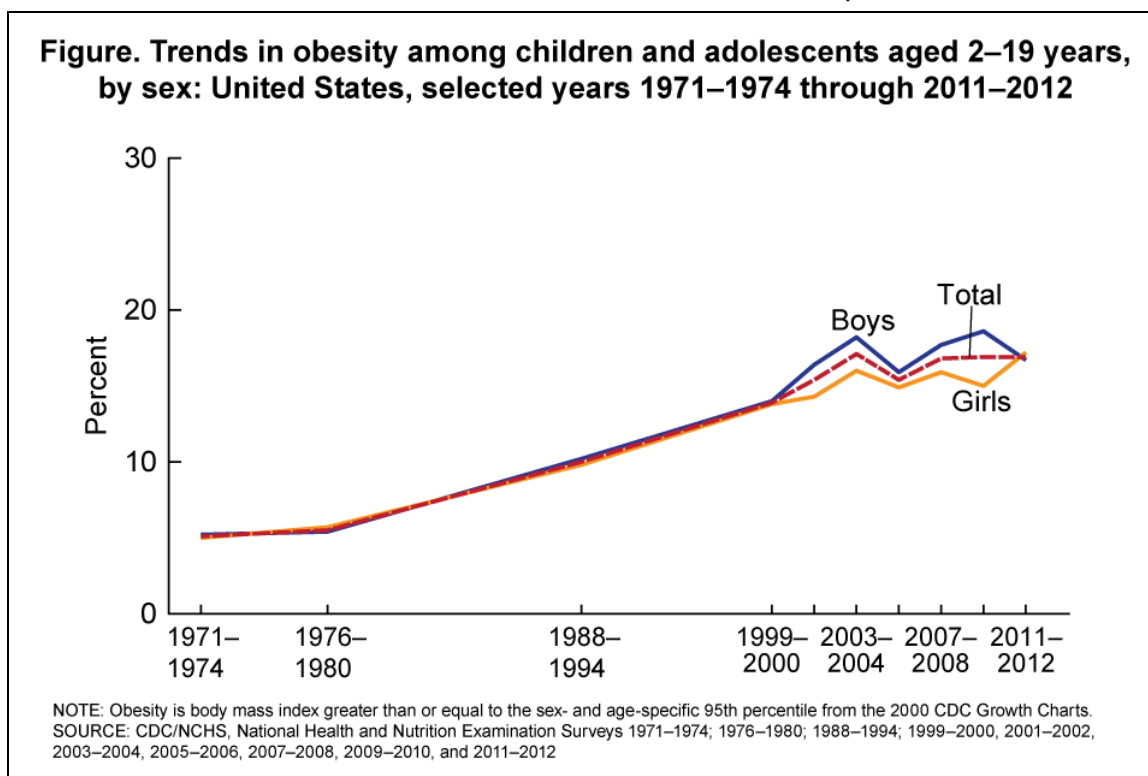
As shown in **Figure 2**, since 1971-1974, there was an increase in obesity rates among males and females, and since 1999, male children have generally been more likely to be obese than females.

The overall prevalence of obesity appears to have leveled off since 2003-2004. However, between 1999-2000 and 2007-2008, there was a shift among obese children to higher percentiles, with male children and adolescents more likely to be at or above the 97th percentile, as shown in **Appendix B**. In 2009-2010, 14% of male children and 11% of female children 2 to 19 years old had a BMI at the 97th percentile or above.

²³ C Fryar, M Carroll, and C Ogden, "Prevalence of Overweight and Obesity among Children and Adolescents: United States, 1963-1965 through 2011-2012," NCHS Health E-Stat: http://www.cdc.gov/nchs/data/hestat/obesity_child_11_12/obesity_child_11_12.htm.

Figure 2. Sex Differences in Trends in Obesity Among Children and Adolescents, 1971-2012

National Health and Nutrition Examination Survey



Source: C Fryar, M Carroll, and C Ogden, “Prevalence of Overweight and Obesity Among Children and Adolescents: United States, 1963-1965 through 2011-2012,” NCHS Health E-Stat: http://www.cdc.gov/nchs/data/hestat/obesity_child_11_12/obesity_child_11_12.htm.

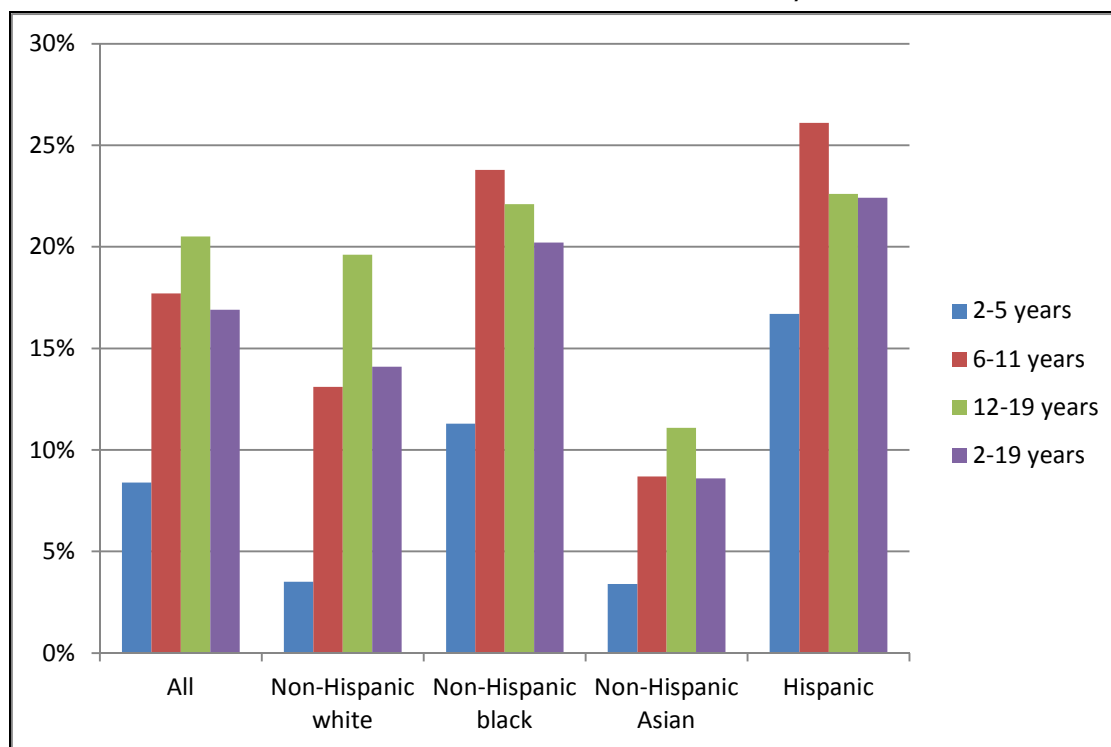
The increase in overweight and obese children since 1971 is evident among all age, race, and ethnic groups; however, African American and Hispanic children have been disproportionately affected.²⁴ This trend is reflected in the most recent statistics (see **Figure 3**). In 2011-2012, obesity prevalence was higher among Hispanic (22.4%) and non-Hispanic black youth (20.2%) than non-Hispanic white youth (14.1%), and prevalence was lowest in non-Hispanic Asian youth (8.6%).²⁵

²⁴ Y Wang and M Beydoun, “The Obesity Epidemic in the United States—Gender, Age, Socioeconomic, Racial/Ethnic, and Geographic Characteristics: A Systematic Review and Meta-Regression Analysis,” *Epidemiol Rev*, vol. 29 (2007), pp. 6-28.

²⁵ C Ogden, M Carroll, B Kit, et al., “Prevalence of Childhood and Adult Obesity in the United States, 2011-2012,” *JAMA*, vol. 311, no. 8 (February 26, 2014), pp. 806-814.

Figure 3. Prevalence of Overweight and Obesity in Children and Adolescents, by Age and Race/Ethnicity, 2011-2012

National Health and Nutrition Examination Survey, CDC



Source: CRS analysis based on data from NHANES (2011-2012) as presented in C Ogden, M Carroll, B Kit, et al., "Prevalence of Childhood and Adult Obesity in the United States, 2011-2012," *JAMA*, vol. 311, no. 8 (February 26, 2014), pp. 806-814

Notes: Non-Hispanic individuals were categorized into four different groups: Non-Hispanic white, non-Hispanic black, non-Hispanic Asian, and other. Individuals in the "other" group were included in calculations of the total population but not reported separately.

Variation by Socioeconomic Status and Geographic Location

Overweight and obesity in children and adolescents have been associated with lower socioeconomic status and geographic location, particularly in the southeastern states.²⁶ The following section presents some background information on these disparities.

NSCH data suggests that the magnitude of socioeconomic disparities in obesity prevalence increased between 2003 and 2007. One analysis indicates that, during this time period, obesity prevalence increased by nearly 25% for children in low-income households, while the prevalence increased by less than 10% for children of high-income households.²⁷ The same study notes that,

²⁶ Y Wang and M Beydoun, "The Obesity Epidemic in the United States—Gender, Age, Socioeconomic, Racial/Ethnic, and Geographic Characteristics: A Systematic Review and Meta-Regression Analysis," *Epidemiol Rev*, vol. 29 (2007), pp. 6-28.

²⁷ G Singh, and M Kogan, "Childhood Obesity in the United States, 1976-2008: Trends and Current Racial/Ethnic, Socioeconomic, and Geographic Disparities," HHS, Health Resources and Services Administration, Maternal and Child Health Bureau. Rockville, MD, 2010.

in 2007, children from low-income and low-education households had three times higher obesity prevalence than children from households with higher socioeconomic status. NSCH findings from 2011-2012 also suggest that obesity rates were higher for children in low-income households compared with higher-income households (see **Table 1**).

Table 1. BMI-for-age by Household Income

National Survey of Children's Health

	Overweight			Obese		
	2003	2007	2011/12	2003	2007	2011/12
0-99% FPL	17.8%	17.6%	18.1%	22.1%	27.2%	26.6%
100-199% FPL	18.1%	17.0%	18.2%	18.7%	20.9%	19.1%
200-399% FPL	15.1%	15.9%	15.2%	13.8%	14.9%	13.5%
≥400% FPL	13.5%	12.3%	12.9%	9.3%	9.8%	9.0%

Source: CRS analysis based on data from NSCH (2003, 2007, 2011/12), at <http://childhealthdata.org>.

Notes: FPL= Federal Poverty Limit.

Another study using NHANES data shows a low-income/high-income difference in obesity prevalence that is generally consistent with the NSCH findings. However, this study found a narrower range of obesity prevalence and determined that the relationship between income and obesity is not consistent across racial and ethnic groups. For example, obesity rates vary significantly across socioeconomic status for non-Hispanic whites (from 10.2% in high-income households to 20.7% in low-income households), but less so for Mexican Americans and non-Hispanic blacks. The study also showed an inverse relationship between parents' education and obesity prevalence among children; this relationship was significant among non-Hispanic whites and non-Hispanic blacks, but not among Mexican Americans.²⁸

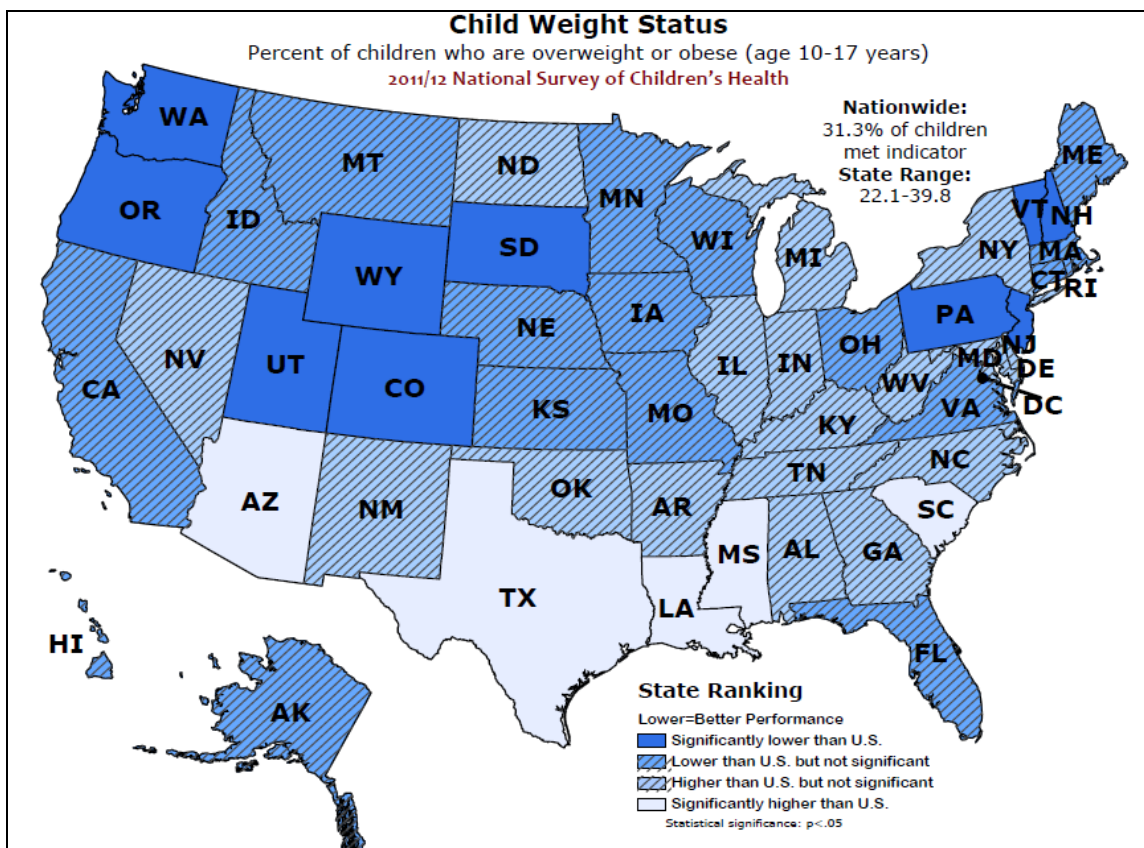
Figure 4 presents a map of BMI ranking relative to the nation, by state, of children ages 10 to 17. Parent-reported data on weight and height for younger children are considered less reliable by researchers, and therefore are not presented in the state by state analysis. Prevalence of overweight and obesity was highest in Louisiana (39.8%) and Mississippi (39.7%), and lowest in Utah (22.1%). Four of the five states (Texas, Louisiana, South Carolina, and Mississippi)²⁹ with overweight and obesity prevalence that is statistically significantly higher than the U.S. average are located in the southeastern region of the United States.³⁰

²⁸ C Ogden, M Lamb, M Carroll et al., *Obesity and Socioeconomic Status in Children and Adolescents: United States, 2005-2008*, National Center for Health Statistics, Hyattsville, MD, December 2010, <http://www.cdc.gov/nchs/data/databriefs/db51.pdf>. This data brief specifically looked at the subgroup of Mexican Americans as opposed to Hispanic individuals as a whole.

²⁹ The fifth state with the highest rates of childhood overweight and obesity is Arizona.

³⁰ National Survey of Children's Health 2011/12, *Percent of children whose weight status is at or above the 85th percentile for Body Mass Index (BMI) (age 10-17)*, <http://childhealthdata.org/browse/rankings/maps?s=84>.

Figure 4. Obese and Overweight Children and Adolescents Age 10 to 17, by State
(National Survey of Children's Health, Maternal and Child Health Bureau)



Source: National Survey of Children's Health, 2011-2012, <http://childhealthdata.org/browse/rankings/maps?s=84>.

Note: Ranking is based on the percentage of children in each state who are at or above the 85th percentile for body mass index (BMI).

Obesity and Health Insurance

NSCH data suggest that the prevalence of overweight and obesity among children and adolescents aged 10 to 17 years varies by health insurance status. In 2011-2012, overweight and obesity prevalence was greater among publicly insured (42.7%) than privately insured (24.9%) children and adolescents (see **Figure 5**).³¹ This is a slight decrease from 2007, when 43.2% of publicly insured and 27.3% of privately insured children and adolescents were reportedly overweight or obese.³² Among the uninsured, prevalence of overweight and obesity increased from 32.4% in 2007 to 37.6% in 2011-2012.

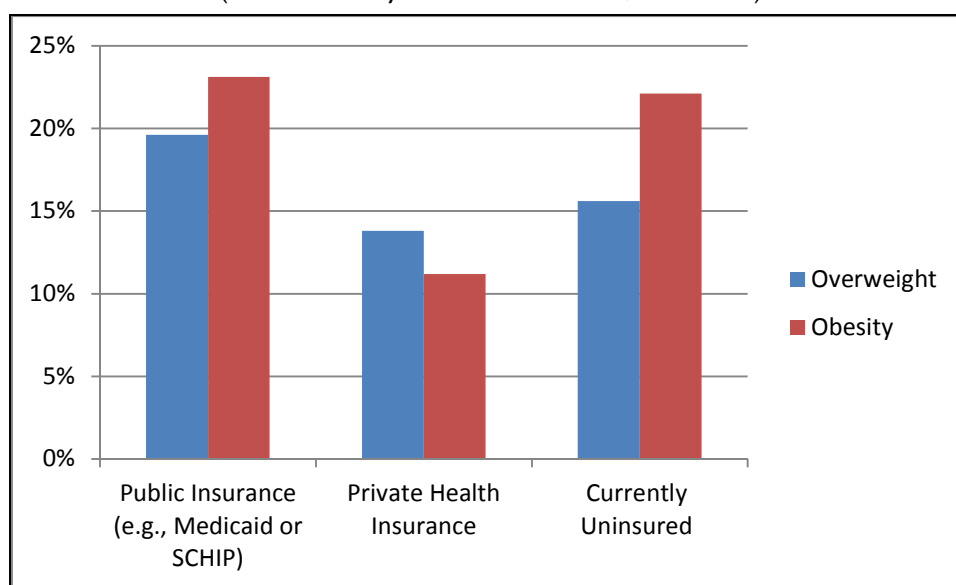
³¹ National Survey of Children's Health, 2011-2012, Percent of Children Whose Weight Status is at or above the 85th percentile for Body Mass Index (BMI) (age 10-17), by Type of Insurance, <http://childhealthdata.org>.

³² C Bethell, M Kogan, B Strickland, et al., "A National and State Profile of Leading Health Problems and Health Care Quality for U.S. Children: Key Insurance Disparities Across-State Variations," *Academic Pediatrics*, vol. 11, no. 3S (May/June 2011), pp. S22-S33.

Health insurance coverage has been cited as strongly related to better health outcomes,³³ and studies have reported a higher likelihood of overweight or obesity among publicly insured children, even after adjusting for other demographic, health status, health behavior, health care, and neighborhood factors.³⁴

Figure 5. Overweight and Obese Children and Adolescents Age 10-17, by Insurance Status

(National Survey of Children's Health, 2011-2012)



Sources: CRS analysis of NSCH data. National Survey of Children's Health. NSCH 2011/12. Data query from the Child and Adolescent Health Measurement Initiative, Data Resource Center for Child and Adolescent Health website. Retrieved October 23, 2014, from <http://www.childhealthdata.org>.

Factors Associated with Childhood Overweight and Obesity

At the individual level, obesity is thought to be caused by a number of interacting genetic, behavioral, and environmental factors.³⁵ Some behavioral factors associated with childhood obesity are modifiable at the individual or family level, including energy intake, physical activity, and sedentary behaviors. At the most basic level, obesity is the result of a positive energy balance—too many calories in and too few calories expended. Research shows that overall diet quality in the United States remains poor, especially among those of lower socioeconomic status.³⁶ Sugary drinks, in particular, are the largest source of added sugar and a significant

³³ CDC, *Fact Sheet—CDC Health Disparities and Inequalities Report—U.S., 2011*, Atlanta, GA, <http://www.cdc.gov/minorityhealth/CHDIR/2011/FactSheet.pdf>.

³⁴ C Bethell, L Simpson, S Stumbo, et al., "National, State, and Local Disparities in Childhood Obesity," *Health Affairs*, vol. 29, no. 3 (March 2010), pp. 347-356.

³⁵ CDC, *Overweight and Obesity*, Atlanta, GA, April 17, 2013, <http://www.cdc.gov/obesity/childhood/causes.html>.

³⁶ D Wang, C Leung, Y Li, et al., "Trends in Dietary Quality among Adults in the United States, 1999 through 2010," (continued...)

contributor of calories to the diets of children.³⁷ The 2010 Dietary Guidelines for Americans cite that children's intakes of solid fats and added sugars exceed recommendations, while intake of nutrients of public health concern (e.g., calcium, dietary fiber, potassium, and vitamin D), whole grains, fruits, and vegetables is inadequate.³⁸ Several studies have shown that availability of food in the home is related to food consumption in youth, and this relationship has been found for fruit and vegetable consumption, as well as soft drink and snack food intake.³⁹ Research shows that children who are not physically active have a 37% higher risk of obesity than those who exercise five days per week. In addition, children who watch more than two hours of television per day had a 52% higher risk of obesity than children who watched less than one hour per day.⁴⁰

Environmental factors such as schools, communities, large portion sizes, and advertising may also influence eating habits of children. Lack of physical education in schools, and lack of access to safe places to exercise or play in certain communities, may limit physical activity. One study notes that children aged 10 to 17 who live in neighborhoods with the most unfavorable social conditions, such as unsafe surroundings, poor housing, and no access to sidewalks, parks, and recreation centers, have 20% to 60% higher odds of being obese than children who live in neighborhoods with more favorable social conditions.⁴¹ These same communities often have limited access to stores and supermarkets with healthy and affordable food options.⁴² Large portion sizes and television advertisements have also been found to increase food intake in children, as the foods most often marketed toward children are high in calories, sugar, sodium, and fat.⁴³

Health Risks Associated with Childhood Overweight and Obesity

Childhood and adolescent obesity has consequences that may last into adulthood. Youth who are overweight or obese have a higher risk of developing high blood pressure, high cholesterol, and abnormal glucose tolerance, which are risk factors for developing cardiovascular disease later in

(...continued)

JAMA Intern Med., vol. 174, no. 10 (2014), pp. 1587-1595.

³⁷ Y Wang, S Bleich, and S Gortmaker, "Increasing Caloric Contribution from Sugar-sweetened Beverages and 100% Fruit Juices among US Children and Adolescents, 1988–2004," *Pediatrics*, vol. 121, no. 6 (2008), pp. e1604–1614.

³⁸ USDA and HHS, 2010 *Dietary Guidelines for Americans, 2010*, 7th Ed., Washington DC: U.S. Government Printing Office. Retrieved from <http://www.cnpp.usda.gov/DGAs2010-PolicyDocument.htm>.

³⁹ N Hanson, D Neumark-Sztainer, M Eisenberg, et al., "Associations between Parental Report of the Home Food Environment and Adolescent Intakes of Fruits and Vegetables and Dairy Foods," *Public Health Nutrition*, vol. 8, no. 1 (2005), pp. 77-85. K Campbell, D Crawford, and J Salmon, et al., "Associations between the Home Food Environment and Obesity-promoting Eating Behaviors in Adolescence," *Obesity*, vol. 15, no. 3 (2007), pp. 719-730.

⁴⁰ G Singh, M Siahpush, and M Kogan, "Rising Social Inequalities in U.S. Childhood Obesity, 2003-2007," *Ann Epidemiol*, vol. 20 (2010), pp. 40-52.

⁴¹ G Singh, M Siahpush, and M Kogan, "Neighborhood Socioeconomic Conditions, Built Environments, and Childhood Obesity," *Health Affairs*, vol. 29, no. 3 (2010), pp. 503-512.

⁴² N Larson, M Story, and M Nelson, "Neighborhood Environments: Disparities in Access to Healthy Foods in the U.S.," *American Journal of Preventive Medicine*, vol. 36, no. 1 (January 2009), pp. 74-81.

⁴³ Institute of Medicine, *Food Marketing to Children and Youth: Threat or Opportunity?*, Washington, DC, National Academies Press, December 2005.

life.⁴⁴ Other health conditions associated with obesity are asthma, hepatic steatosis (i.e., fatty liver), sleep apnea, and Type 2 diabetes.⁴⁵ Children with these conditions also have a higher risk of disability.

Increasing rates of childhood chronic conditions may also lead to increases in long-term health burdens among adults, along with increasing medical and disability costs, and decreased work force participation. After age 6, obese children may have a 50% greater chance of becoming obese adults, regardless of their parents' obesity status.⁴⁶ Obesity in adults is associated with increased risk of a number of conditions, including diabetes, cardiovascular disease, hypertension, and certain cancers.

In 2011, heart disease, cancer, and diabetes mellitus were among the leading causes of death in the United States, and modifiable risk factors (e.g., poor diet, overweight, and lack of physical activity) are cited as largely responsible for these deaths.⁴⁷ In one study, poor diet and physical inactivity were found to be the second-highest actual cause of death, behind tobacco use.⁴⁸ Another recent study of American Indians showed that elevated BMI in childhood was associated with a higher risk of premature death.⁴⁹ This long-term study of American Indian children found that those in the highest BMI quartile had more than double the risk of premature death than those in the lowest quartile.

Finally, children and adolescents who are overweight may also have social issues; they may be subject to social discrimination, which has long-term effects on self-esteem.⁵⁰ Overweight and obese children are less likely to be engaged in school, more likely to repeat a grade in school, and more likely to miss two or more weeks of school per year.⁵¹

Conclusion

Healthy People 2010, which was released in 2000, set a number of objectives, including reducing the proportion of children and adolescents who are overweight or obese. The goal to reduce the proportion of obese children and adolescents to 5% was not achieved. During this 10-year time

⁴⁴ R Krauss, M Winston, and B Fletcher et al., "Obesity: Impact on Cardiovascular Disease," *Circulation*, vol. 98 (1998), pp. 1472-1476. W Dietz, "Health Consequences of Obesity in Youth: Childhood Predictors of Adult Disease," *Pediatrics*, 1998, vol. 101, pp. 518-525.

⁴⁵ Centers for Disease Control and Prevention, Atlanta, GA, March 19, 2010, <http://www.cdc.gov/obesity/childhood/consequences.html>.

⁴⁶ R Whitaker, J Wright, M Pepe, et al., "Predicting Obesity in Young Adulthood from Childhood and Parental Obesity," *NEJM*, vol. 337, no. 13 (1997), pp. 869-73.

⁴⁷ N Johnson, L Hayes, K Brown, et al., CDC National Health Report: Leading Causes of Morbidity and Mortality and Associated Risk and Protective Factors—United States, 2005-2013, *MMWR*, vol. 63, no. 4 (October 31, 2014), pp. 3-27, http://www.cdc.gov/mmwr/preview/mmwrhtml/su6304a2.htm?s_cid=su6304a2_e.

⁴⁸ A Mokdad, J Marks, D Stroup, et al., "Actual Causes of Death in the United States, 2000," *JAMA*, vol. 291, no. 10 (March 10, 2004), pp. 1238-1245.

⁴⁹ P Franks, R Hanson, W Knowler, et al., "Childhood Obesity, Other Cardiovascular Risk Factors, and Premature Death," *NEJM*, vol. 362, no. 6 (February 11, 2010), pp. 485-93.

⁵⁰ M Swartz and R Puhl, "Childhood Obesity: A Societal Problem to Solve," *Obesity Reviews* 2003, vol. 4, no. 1, pp. 57-71.

⁵¹ C Bethell, L Simpson, S Stumbo, et al., "National, State, and Local Disparities in Childhood Obesity," *Health Affairs*, vol. 29, no. 3 (2010), pp. 347-356.

period, obesity prevalence increased from 11% to 17% among 6- to 11-year-olds and from 11% to 18% among 12- to 18-year-olds. *Healthy People 2020*, released in 2010, set a goal of reducing child and adolescent obesity by 10%, from 16.1% to 14.6%.⁵²

The recent decrease in obesity prevalence among the youngest children suggests progress toward achieving the objectives outlined in *Healthy People 2020*. In the two- to five-year-old age group, the proportion of children who are considered obese fell from 10.4% in 2005-2008 to 8.4% in 2011-2012, dropping below the target goal of 9.4%.⁵³ This is significant, as research shows that preventing obesity early in life may help young people maintain a healthy weight into adulthood.

While no individual survey or surveillance system can provide the complete picture, the data consistently show that the prevalence of obesity among children and adolescents remains high, particularly among black and Hispanic youth, as well as among those in lower-income households.

Research has suggested a comprehensive, multi-pronged policy approach to childhood overweight and obesity. The USDA has implemented several regulations for childhood nutrition programs, the CDC has funded state- and community-level interventions, and several reports and recommendations have been issued by the IOM, the U.S. Surgeon General, and the White House. USDA and HHS are in the process of developing the 2015 Dietary Guidelines for Americans, which provide the basis for federal food and nutrition policy.⁵⁴ The Food and Drug Administration (FDA) has proposed two rules to update the Nutrition Facts label, including a provision that would require labeling of added sugars, a major source of calories in the diets of American children (see CRS Report R43733, *Revision of the Nutrition Facts Label: Proposed Rules*).

It remains to be seen whether updated nutrition standards in school cafeterias, community initiatives, and new labeling requirements will make an impact on child and adolescent obesity rates. Childhood obesity is a complex and multi-faceted issue that has been addressed by a wide variety of policies, encompassing education and health communication, policy development and support at the state and community level, scientific and public health research, and delivery of services, including nutrition programs. The data sources discussed in this report may provide decision-making tools for these policies and programs. They may also provide valuable benchmarks during implementation and evaluation of these new laws.

⁵² National Center for Health Statistics, *Health People 2010 Final Review*, Hyattsville, MD, 2012, pp. 359-361, http://www.cdc.gov/nchs/data/hpdata2010/hpdata2010_final_review.pdf.

⁵³ HHS, *Healthy People 2020*, Topics & Objectives: Nutrition and Weight Status, <http://www.healthypeople.gov/2020/topics-objectives/topic/nutrition-and-weight-status/objectives>.

⁵⁴ HHS, Office of Disease Prevention and Health Promotion, *Dietary Guidelines for Americans 2015*, <http://www.health.gov/dietaryguidelines/2015.asp#qanda>

Appendix A. Data Sources on Childhood Overweight and Obesity

Table A-1. Characteristics of the NSCH, YRBSS, NHANES, and PedNSS

	NSCH	YRBSS	NHANES	PedNSS
Description	NSCH is a nationally representative telephone survey on a variety of physical, emotional, and behavioral child health indicators, information on the child's family context and neighborhood environment.	YRBSS is a nationally representative survey designed to monitor priority health-risk behaviors and the prevalence of obesity and asthma among youth and young adults.	NHANES is a nationally representative survey designed to study national health trends and data.	PedNSS is a clinic-based surveillance system that provides data on the prevalence and trends of nutrition-related indicators of low-income U.S. children.
Survey Universe	All children and adolescents under 18 years of age	Students in grades 9-12	All persons	Children from birth to age 5 who attend federally funded maternal and child health and nutrition programs
Frequency	Every four years	Every two years	Continuous	Continuous—ended in 2012
Survey Years	2003, 2007	Began in 1990	Began in the 1960s as a series of surveys; in 1999 it became a continuous survey.	1999-2012
Annual Sample Size	Approximately 91,000 in 2007	Approximately 16,000 students in 2009	Approximately 5,000 persons	Approximately 8 million children in 2008
Survey Mode	Telephone survey	Self-administered questionnaire	In-person interviews and physical examinations	Existing data from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) Program; and Title V Maternal and Child Health Program (MCH)
Available Geographies	Nation and states	Nation and states ^c	Nation only	Nation and states ^c
Collected Demographics				
Age	Children from birth through age 17	Students in grades 9-12	All ages	Children from birth through age 4
Gender	Male and female	Male and female	Male and female	Male and female

	NSCH	YRBSS	NHANES	PedNSS
Race	White, Black, Asian, NHOPI, ^a AIAN, ^b Other	White, Black, Asian, NHOPI, ^a AIAN, ^b Other	White, Black, Asian, NHOPI, ^a AIAN, ^b Other	White, Black, Asian, NHOPI ^a , AIAN ^b , Other
Ethnicity	Hispanic/Latino	Hispanic/Latino	Hispanic/Latino	Hispanic/Latino
Obesity Data Collection Process	Respondents self-report height and weight and the CDC uses the measurements to calculate each respondents' BMI.	Respondents self-report height and weight and the CDC uses the measurements to calculate each respondents' BMI.	Medical personnel measure respondents' height and weight to calculate BMI as part of the physical examination.	Medical personnel measure respondents' height and weight to calculate weight for length or BMI as part of the clinic visit.

Source: Centers for Disease Control and Prevention, “National Health and Nutrition Examination Survey,” at <http://www.cdc.gov/nchs/nhanes.htm>; “Youth Risk Behavior Surveillance System,” at <http://www.cdc.gov/HealthyYouth/yrbs/index.htm>; “Pediatric Nutrition Surveillance System,” at <http://www.cdc.gov/pednss/index.htm>; Maternal and Child Health Bureau, Health Resources and Statistics Administration, “National Survey of Children’s Health,” at <http://www.cdc.gov/pednss/index.htm>.

- a. Native Hawaiian and Other Pacific Islander.
- b. American Indian and Alaskan Native.
- c. Participation in these surveillance systems varies from year to year; some contributors do not participate every year.

Appendix B. Overweight and Obesity, by Age and Sex

Table B-1. Percentage of Children and Adolescents with High BMI, by Sex and Age, 2009-2010

	All	Age 2-5	Age 6-11	Age 12-19
All Children				
≥ 85% Percentile	31.8	26.7	32.6	33.6
≥ 95% Percentile	16.9	12.1	18.0	18.4
≥ 97% Percentile	12.3	9.7	13.0	13.0
Male				
≥ 85% Percentile	33.0	29.7	33.1	34.6
≥ 95% Percentile	18.6	14.4	20.1	19.6
≥ 97% Percentile	13.9	11.5	14.6	14.7
Female				
≥ 85% Percentile	30.4	23.4	32.1	32.6
≥ 95% Percentile	15.0	9.6	15.7	17.1
≥ 97% Percentile	10.5	7.9	11.3	11.2

Source: CRS analysis based on data from NHANES (2009-2010) as presented in C Ogden, M Carroll, B Kit, et al., "Prevalence of Obesity and Trends in Body Mass Index Among US Children and Adolescents, 1999-2010," *JAMA*, vol. 307, no. 5 (February 1, 2012), pp. 483-490.

Appendix C. Overweight and Obesity, by Race/Ethnicity and Sex

Table C-1. Percentage of Children and Adolescents with High BMI Age 2 Through 19 Years, by Sex and Race/Ethnicity, 2009-2010

	All	Non-Hispanic White	Non-Hispanic Black	All Hispanics	Mexican-American
All					
≥ 85% Percentile	31.8	27.9	39.1	39.1	39.4
≥ 95% Percentile	16.9	14.0	24.3	21.2	21.2
≥ 97% Percentile	12.3	9.8	18.6	15.6	15.5
Male					
≥ 85% Percentile	33.0	30.1	36.9	39.6	40.5
≥ 95% Percentile	18.6	16.1	24.3	23.4	24.0
≥ 97% Percentile	13.9	11.6	19.4	17.6	18.2
Female					
≥ 85% Percentile	30.4	25.6	41.3	38.6	38.2
≥ 95% Percentile	15.0	11.7	24.3	18.9	18.2
≥ 97% Percentile	10.5	7.8	17.8	13.5	12.7

Source: CRS analysis based on data from NHANES (2009-2010) as presented in C. Ogden, M. Carroll, L. Curtin, et al., "Prevalence of Obesity and Trends in Body Mass Index in U.S. Children and Adolescents, 1999-2010," *JAMA*, vol. 307, no. 5 (February 1, 2012), pp. 483-490.

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