

Obesity and Overweight

Definition: The U.S. Centers for Disease Control and Prevention (CDC) defines overweight and obesity weights that are greater than those generally healthy for a given height. These weights often increase the likelihood of health problems. CDC defines overweight for adults as body mass index (BMI) of 25–29.9 and obesity as a BMI of 30 or higher. BMI is calculated by dividing weight in kilograms by height in meters squared. A child's weight status is determined using age- and sex-specific BMI percentiles. Children with BMIs in the 85–94th percentiles on BMI-for-age growth charts are considered overweight; children with BMIs at the 95th percentile or higher are obese. BMI does not distinguish between fat and lean body mass. This chapter focuses on adult obesity because obesity is more consistently linked to poor health than is overweight. For children, the chapter presents information on overweight and obesity, because overweight children are more likely than normal weight children to be obese as adults.

Summary

Based on self-reported heights and weights, in 2012, 27% ($\pm 1\%$) of Washington adults were obese and another 34% ($\pm 1\%$) were overweight. Obesity rates were highest for those with the lowest incomes and education levels. Washington's American Indian and Alaska Native and black residents had higher rates of obesity than other racial and ethnic groups even after accounting for income and education.

In 2012, Washington's 10th graders reported heights and weights indicating 10% ($\pm 2\%$) as obese and an additional 13% ($\pm 1\%$) as overweight. In the same year, measurements showed about 11% of two- to four-year-olds in low-income families served by the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) as obese and 14% as overweight. Almost 25% of women who gave birth in 2011 reported heights and weights indicating obesity at the start of their pregnancies; 48% gained more weight than recommended during pregnancy.

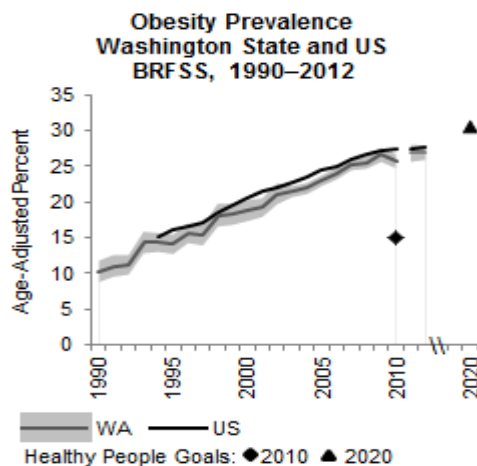
Obesity and overweight can develop throughout the lifespan, but risk is highest in middle age. Overweight or obese children are more likely than children with normal weights to become obese adults.¹ Adults who are obese or overweight are more likely to develop a number of serious diseases and to die at younger ages than people who are not obese or overweight.^{2,3,4,5} Obese women are at higher risk of health complications during pregnancy, and are less likely to breastfeed.^{6,7} Gaining more weight during pregnancy than recommended can cause

poor birth outcomes and increases the risk of retaining extra weight after the baby is born.⁶

Good nutrition and adequate physical activity are two of the most important factors for preventing obesity. The current food and physical activity environments, however, make it hard to achieve these goals. To reduce obesity, the U.S. Institute of Medicine recommends fostering individual behavior change through policy and environmental change.⁸

Time Trends

Adult obesity. On both the 2011 and 2012 Washington [Behavioral Risk Factor Surveillance System \(BRFSS\)](#) surveys, 27% ($\pm 1\%$) of Washington adults reported heights and weights indicating obesity. This is the same as the [age-adjusted](#) percent shown below.



NOTE: Washington and US data are based on self-reported heights and weights that underestimate obesity; Healthy People goals use measured heights and weights.

Data for 2011 and 2012 are not comparable to earlier years due to changes in methods for collecting and analyzing BRFSS data. (See BRFSS Caveats in [Appendix B](#).) Older BRFSS data found that the age-adjusted percent of Washington adults who were obese increased from 10% ($\pm 2\%$) in 1990 to 26% ($\pm 1\%$) in 2010. Special analyses to bridge the change in BRFSS methods indicate that the increase is leveling off. Depending on the statistical model used, this leveling off might have begun as early as 2007.

Childhood overweight and obesity. Based on self-reported heights and weights, the 2012 [Healthy Youth Survey](#) showed 10% ($\pm 2\%$) of 10th graders as obese and 13% ($\pm 1\%$) as overweight. In Washington, rates of overweight and obesity among adolescents have not changed since 2002, the earliest year with consistent reporting.

Availability of data on younger children in Washington is limited. Based on measured heights and weights in 2012, about one-quarter of children ages two through four in low-income families served by the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) were overweight or obese. This includes about 11% who were obese and 14% who were overweight. (See [Technical Notes](#).) Rates of overweight and obesity decreased from 2010–2012 after remaining steady for 2004–2010. The decrease in obesity beginning in 2010 might partly reflect changes in WIC implemented in 2009.^{9,10} Changes were designed to increase rates of breastfeeding and improve the nutritional content of foods available through WIC.

2010 and 2020 Goals

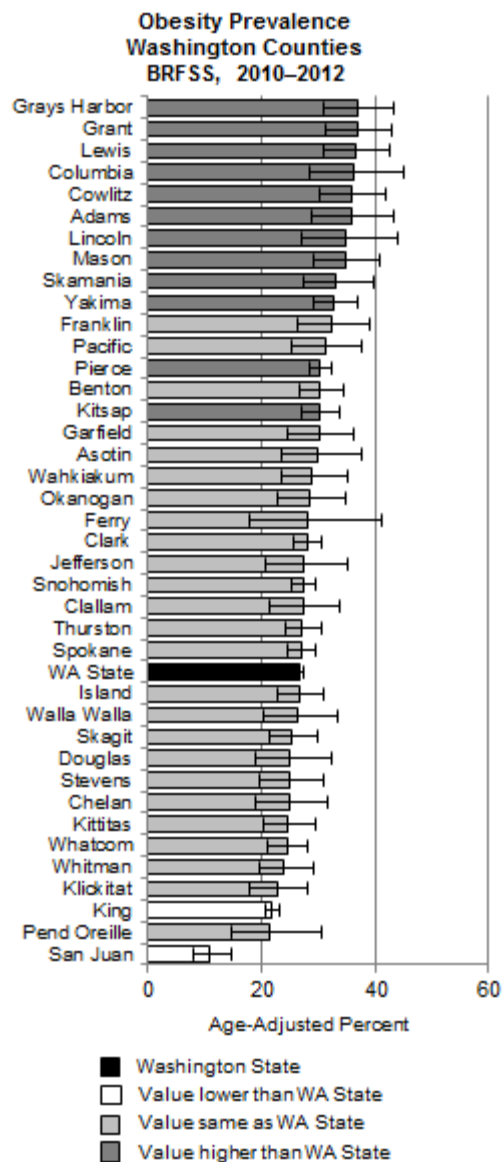
National *Healthy People* goals are based on measured heights and weights. Measured heights and weights are not routinely available in Washington and so Washington’s obesity rates are based on self-reported heights and weights. A 2007–2008 study in Washington found that obesity rates based on measured heights and weights were about 10 percentage points higher than obesity rates based on self-reported heights and weights.¹¹ Thus, self-reported heights and weights underestimate obesity.

The *Healthy People 2010* goal was to decrease the age-adjusted prevalence of obesity based on measured heights and weights to 15% in adults ages 20 and older. Given that Washington’s

age-adjusted 2010 obesity prevalence for people ages 20 and older based on self-reported heights and weights was 27% ($\pm 1\%$), Washington did not meet this goal. (See [Technical Notes](#).)

The *Healthy People 2020* goal for obesity among adults ages 20 and older is an age-adjusted prevalence of 30.5% based on measured heights and weights. For Washington, this would be the equivalent of about 20.5% based on self-reported heights and weights. In 2011, the age-adjusted prevalence of obesity for Washington residents ages 20 and older was 27% ($\pm 1\%$) based on self-reported height and weights. Washington rates need to decline if we are to meet this goal.

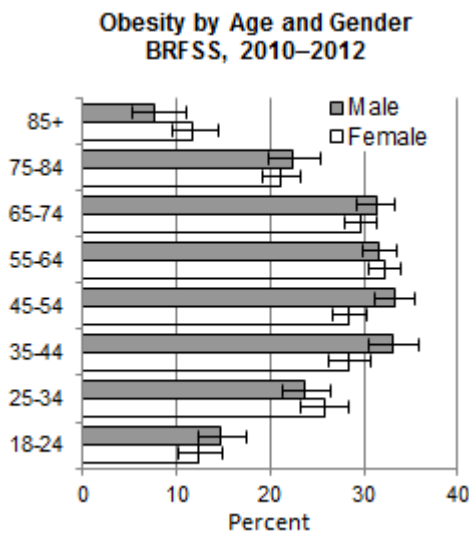
Geographic Variation



Adult obesity rates are not consistent throughout Washington. Based on Washington BRFSS data for 2010–2012, estimates for age-adjusted rates ranged from 11% ($\pm 3\%$) in San Juan County to 37% ($\pm 6\%$) in both Grays Harbor and Grant counties.

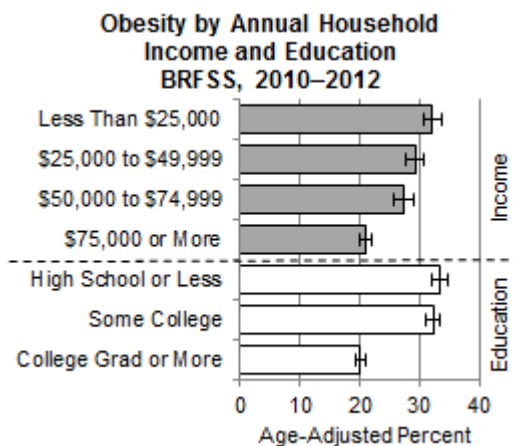
Age and Gender

Consistent with national 2011 BRFSS data, Washington BRFSS data for 2010–2012 show that obesity rates in adults increase with age until 45, hold steady through 74 and then decline. Overall, men are slightly more likely to be obese than women (28% $\pm 1\%$ compared to 26% $\pm 1\%$).



Economic Factors and Education

BRFSS data for 2010–2012 combined show that obesity rates are lowest in higher income families. During the same time period, college graduates had lower obesity rates than those with less education.

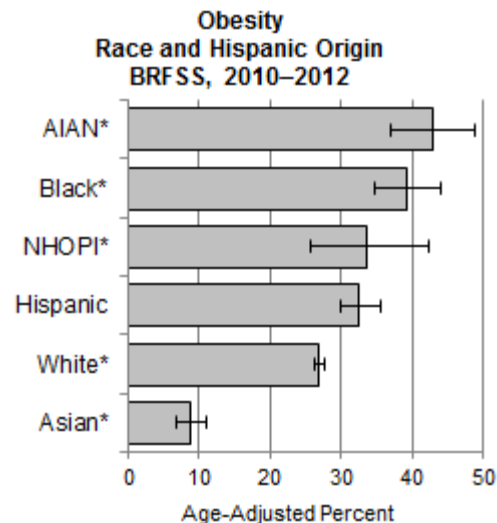


The patterns for income and education are similar to those in the 2011 national BRFSS and remained after accounting for each other and for race, Hispanic origin, gender and age.

Among WIC children ages two through four, those in families with annual household incomes at or below the federal poverty limit have higher levels of obesity and overweight than low-income families with higher incomes (28% and 24%, respectively).

Race and Hispanic Origin

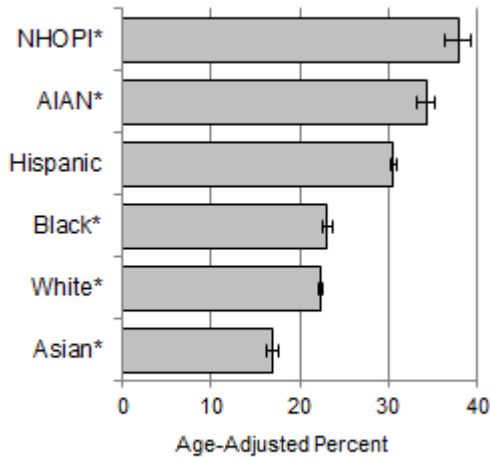
BRFSS data for 2010–2012 combined showed Asians having the lowest rate of obesity followed by whites and people of Hispanic origin. American Indian and Alaska Native (AIAN) and black Washington residents reported weights and heights that resulted in higher levels of obesity than those for Asian, white and Hispanic residents. Rates for Native Hawaiians and other Pacific Islanders (NHOPI) are hard to interpret due to the wide margin of error. These differences remained after accounting for gender, income, education and age. National 2011 BRFSS data show similar patterns of obesity by race and Hispanic origin.



* Non-Hispanic
AIAN: American Indian/Alaska Native
NHOPI: Native Hawaiian/Other Pacific Islander

As with adult obesity, in 2010–2012 Washington’s children of Asian heritage attending WIC clinics had the lowest rates of overweight and obesity (17%). Unlike adults, black and white children had similar rates (23% and 22%, respectively). Hispanic children had intermediate rates (31%); AIAN and NHOPI had the highest rates (34% and 38%, respectively).

**Obesity and Overweight
Race and Hispanic Origin
WIC children ages 2–4, 2010–2012**



* Non-Hispanic, single race only
AIAN: American Indian/Alaska Native
NHOPi: Native Hawaiian/Other Pacific Islander

Causes

The ultimate cause of obesity and overweight is energy imbalance. This occurs when people eat more calories than they use. Genetic factors, history of being overweight and exposure to certain chemicals can predispose some people to gaining weight.^{5,12,13} However, environments that make it difficult to eat healthy foods and be physically active are the major causes of the obesity epidemic.⁵

The risk for obesity begins with a mother's health before and during pregnancy. Mothers who are overweight or obese, have gestational diabetes, use tobacco, or who gain too much weight during pregnancy can increase the risk of obesity for their child.^{14,15,16,17,18} Being born too big or too small, and growing too fast in early infancy increases the risk for childhood obesity.^{18,19,20} Breastfeeding protects against childhood obesity.^{18,21,22}

Unhealthy eating and lack of physical activity and adequate sleep are important factors for childhood and adult obesity.^{23,24} The U.S. Institute of Medicine notes fewer opportunities for physical activity and increased amount of time in sedentary activities, such as watching television and using electronic devices; increased advertising and marketing of food to children; increased portion sizes; and more meals eaten at restaurants as important contributors to childhood obesity.²⁵ Restaurant

food tends to be higher in calories than food made at home and portion sizes have grown.²⁶

People in low-income neighborhoods often have limited access to healthy food because it is not available or not affordable. In contrast, foods high in calories from fat or sugar are often inexpensive.²⁷ Individual knowledge also plays a role. Many people do not know how many calories they need or how many calories are in the food they eat.

The environment can also make it difficult to be physically active. In many communities, especially low-income neighborhoods and communities of color, people often do not have access to recreational facilities and safe, walkable streets.²⁸ Automation in the workplace, labor-saving machinery for household chores, automobile travel, and community designs that make it difficult to walk or bicycle contribute to an environment that does not support physical activity.²⁹

Health Effects

Childhood overweight and obesity and adult obesity have significant short- and long-term health effects. Adults with BMIs of 30 or greater are more likely to die at an earlier age than adults with BMIs of 20 to 25. Most of the increased risk can be attributed to obesity-related heart disease and stroke.³⁰ People who are obese or overweight are more prone to develop hypertension, elevated blood cholesterol and diabetes. People with obesity are also at an increased risk of colon, uterine and postmenopausal breast cancer; gall bladder disease; liver disease; sleep apnea; respiratory problems; nonalcoholic fatty liver disease; and osteoarthritis.^{2,3,4,31} In addition, obesity and overweight are associated with decreased emotional well-being throughout the lifespan.³²

Systems Barriers to Change

In addition to environmental barriers to healthy eating and physical activity described under "[Causes](#)," people experience barriers to the clinical treatment of obesity. These include the lack of effective treatment protocols that are realistic in clinical settings, reimbursement structures, and commitment of primary care providers to care for affected patients.³³ The Affordable Care Act put into law obesity screening and counseling for all adults and children, which should decrease barriers to treatment if effective systems can be established.³⁴

Other Measures of Impact and Burden

Morbid obesity. Morbid obesity, defined as a BMI of 40 or higher, has major health and economic impacts. Studies have shown that the risks of death and illness are greatly elevated among morbidly obese people, regardless of gender or race.^{35,36} Washington BRFSS data for 2009–2011 combined showed about 4% ($\pm <1\%$) of adults reporting heights and weights indicating morbid obesity. Morbid obesity varied by race, Hispanic origin, income and education in the same manner as obesity. Women (5% $\pm <1\%$) had higher rates of morbid obesity than men (3% $\pm <1\%$).

Pre-pregnancy obesity and excessive weight gain during pregnancy. The rate of pre-pregnancy obesity has been increasing. The pre-pregnancy morbid obesity rate has been increasing the most rapidly. From 2009–2011, 24% of Washington women who gave birth were obese prior to pregnancy, including 4.3% of women who were morbidly obese. Complications among mothers who are obese when they become pregnant include increased risk of diabetes during pregnancy, pre-eclampsia (high blood pressure and protein in the urine), Caesarean section, and failure to begin or continue breastfeeding. Their infants are at increased risk of high or low birth weight, stillbirth and birth defects, especially those affecting the brain, spinal cord and heart.^{6,37}

Patterns of pre-pregnancy obesity by race and Hispanic origin are similar to patterns of adult obesity. Among pregnant women, Native Hawaiian and Pacific Islander mothers had the highest rates of pre-pregnancy obesity from 2009–2011 (47%). Native American and Alaska Native mothers also had high rates (40%). African American (31%), Hispanic (28%) and white (24%) women had somewhat lower rates. Asian women (8%) had the lowest rate of pre-pregnancy obesity. Obesity before pregnancy also increased as the number of previous births increased. Pre-pregnancy obesity is lower in teen mothers (17%).

Recommended weight gain during pregnancy depends on the mother's BMI before becoming pregnant. The following table shows the Institute of Medicine's 2009 weight categories and recommendations for women with singleton (one-baby) pregnancies.³⁸

Weight category	BMI	Recommended total gain (pounds)
Underweight	Less than 18.5	28–40
Normal	18.5–24.9	25–35
Overweight	25.0–29.9	15–25
Obese	More than 30.0	11-20

Washington birth certificate data for 2009–2011 show that 49% of all women in Washington gained more weight during pregnancy than recommended. Women who were overweight or obese before pregnancy were more likely than normal weight or underweight women to gain more than the recommended amount. This pattern held regardless of maternal age, number of previous births, and race and Hispanic origin. Women with no previous births were most likely to gain more than recommended amounts.

Like pre-pregnancy obesity, weight gain above the recommended range during pregnancy can increase risks for mother and child. Well-established risks for the mother include Caesarean delivery and postpartum weight retention, and movement into a higher BMI category. Infant risks include high birth weight and childhood obesity.^{6,38,39,40}

Intervention Strategies

To decrease overweight and obesity, the Institute of Medicine recommends a comprehensive approach ranging from individual behavior change to policy and environmental change. To be successful, multiple sectors—schools, communities, healthcare, worksites—must be involved in implementing intervention strategies.⁴¹ Many of these strategies are covered in the [Physical Activity](#) and [Nutrition](#) chapters of this document. While maintaining a proper weight is important for health, eating a healthy diet and having adequate levels of physical activity help maintain health regardless of a person's weight.

Preventing obesity. Given the difficulty of losing weight and maintaining weight loss, obesity prevention offers the best hope for reducing obesity rates. Effective strategies consider the effects of interpersonal relationships, institutional or organizational influences, community, and societal policies or systems on behavior.⁴⁴ The Institute of Medicine (IOM)⁴¹ notes an increased need to focus on health equity and recommends strategies to combat the obesity epidemic by:

- Making physical activity an integral and routine part of life.
- Creating food and beverage environments that ensure healthy options are the routine, easy choice.
- Changing traditional ways of providing messages about nutrition and physical activity to encompass new media and communication methods.
- Expanding the role of healthcare providers, insurers and employers.
- Making schools a national focal point for obesity prevention.

Following these recommendations, the Washington State Department of Health collaborates with communities and other governmental agencies to create environments and policies that support individuals in overcoming barriers to physical activity and healthy eating. Focus areas include reducing time people spend watching television and using electronic devices; increasing access to healthy food and opportunities for physical activity; and childcare, school, work and community design and modifications to promote physical activity and healthy eating. The department also works with partners to support breastfeeding, which among other benefits appears to provide a small but consistent effect in reducing risk of childhood obesity.⁴²

Weight loss. The U.S. Preventive Services Task Force recommends that healthcare providers screen all adults for obesity, and refer obese patients to intensive behavioral interventions.⁴³ The American Academy of Pediatrics (AAP) recommends that healthcare providers assess patients' BMIs, recommend healthy eating and physical activity, and advocate for societal changes to encourage healthy behaviors.⁴⁴ Effective weight loss strategies include modifying behavior for caloric restriction and an increase in physical activity.^{30,45} In addition, self-monitoring strategies—such as weighing oneself, planning meals, tracking fat and calories, and adding 30 minutes of physical activity to one's daily routine—might be important in maintaining weight loss.⁴⁶ Behavioral interventions—including educational interventions—with more sessions seem to result in more weight loss.⁴⁷ Multi-component, interactive, computerized programs have resulted in weight loss and

prevention of weight gain, although a review found that in-person interaction resulted in more weight loss.^{48,49} The Guide to Community Preventive Services recommends multi-component workplace interventions focusing on diet, physical activity and cognitive change as effective in helping employees lose weight and maintain weight loss.⁵⁰

For individuals who are extremely obese and have not been able to lose significant amounts of weight and maintain weight loss, medications and surgical approaches for weight loss are becoming more common.⁵¹ The U.S. Agency for Healthcare Research and Quality concludes that medications can promote modest weight loss in adults and that surgery can result in larger weight loss in extremely obese individuals.⁴⁷ Surgery has been shown to be effective in reducing illness and death associated with extreme obesity.⁵² Surgery has been shown to be effective in the short term, but not enough evidence exists to observe long-term effects.^{53,54} Medication and surgery can have serious side effects or complications.^{52,55,56}

Current nutrition and physical activity programs aimed at weight loss for youth have had more long-term success than interventions for adults. A review of these programs notes that components contributing to their effectiveness are behavior modification, reduced intake of high-calorie foods, increased physical activity, and most importantly, parental involvement.^{57,58}

Preventing excessive weight gain during pregnancy. Data suggest that women receiving advice from their health providers are more likely to gain weight within the recommended range during pregnancy.⁵⁹ Thus, providers need to know the 2009 IOM weight gain guidelines, counsel women on appropriate weight gain and monitor gain throughout pregnancy.³⁸ Some studies show that nutrition counseling and interventions to increase physical activity during pregnancy can reduce excessive weight gain during pregnancy.^{60,61,62} Other studies show mixed or no effect.^{59,63,64} The 2009 IOM report recommends that prenatal care providers offer counseling about dietary intake and physical activity tailored to women's life circumstances.³⁸ Programs such as WIC can provide additional nutritional counseling to low-income women. The Washington State Department of Health guide for providers is available at <http://here.doh.wa.gov/materials/healthy-pregnancy-weight-gain>.

Weight loss after pregnancy. Interventions aimed at helping women lose the weight gained during pregnancy have shown limited success. A review of

three studies concluded that interventions including diet and exercise, weight monitoring, counseling, and food and exercise diaries can help women lose weight gained during pregnancy.⁶⁵ The AAP concluded that the relationship between breastfeeding and weight loss after pregnancy is inconclusive due to many confounding factors, such as diet and physical activity.⁶⁶

Weight loss before pregnancy. Research suggests that weight loss in obese women before pregnancy can improve pregnancy outcomes and reduce risk of obesity in the woman's offspring.^{42,67} To facilitate weight loss prior to pregnancy, primary care providers need to screen women, inform them of the risks of being overweight or obese in pregnancy, and recommend steps to achieve a healthy weight.⁶⁸ This is supported in the 2009 IOM report citing evidence that preconception counseling increases women's knowledge and changes attitudes.³⁸ Bariatric surgery, though it carries serious risks and potential complications, has been shown to reduce infertility, some maternal pregnancy complications and adverse outcomes in subsequent pregnancies.⁶⁷ Benefits and risks of maternal bariatric surgery for the newborn continue to emerge. For example, a recent large study in Denmark found that with maternal bariatric surgery fewer newborns were large for gestational age, but more were small for gestational age.

See Related Chapters: [Nutrition](#), [Physical Activity](#), [Diabetes](#), [Coronary Heart Disease](#) and [Stroke](#)

Data Sources (For additional detail, see [Appendix B](#).)

Washington State Behavioral Risk Factor Surveillance System (BRFSS): Washington State Behavioral Risk Factor Surveillance System (BRFSS) Data: 1987–2011. Olympia, Washington: Washington State Department of Health, under federal cooperative agreement numbers: U58/CCU002118 (1987-2003), U58/CCU022819 (2004-2008), U58 DP001996 (2009-2010), or U58/SO000047 (2011–2013); data prepared by Washington State Department of Health, Office of Health Communities.

Washington State Department of Health, Center for Health Statistics, Vital Registration System Annual Statistical Files, Births 1980-2011, released September 2011; data prepared by Office of Healthy Communities.

Washington Healthy Youth Survey: Office of the Superintendent of Public Instruction, Washington State Department of Health, Washington State Department of Social and Health Services, and Washington State Liquor

Control Board, 2002-2012; data prepared by Washington State Department of Health Office of Non-Infectious Conditions Epidemiology.

Women, Infants and Children (WIC) data: Client Information Management System (CIMS). Washington State Department of Health, Office of Nutrition Services; 2004–2012 data extracted May 2013, prepared by Washington State Department of Health Office of Surveillance and Evaluation.

For More Information

Washington State Nutrition and Physical Activity
<http://www.doh.wa.gov/YouandYourFamily/NutritionandPhysicalActivity.aspx>

Center for Public Health Nutrition, University of Washington
<http://depts.washington.edu/uwcpnh/>

Childhood Obesity Prevention Coalition
www.copcwa.org

Weight Gain During Pregnancy in Washington State
<http://here.doh.wa.gov/materials/weight-gain-during-pregnancy-in-washington-state>

Technical Notes

WIC data. The Washington State Department of Health maintains the Client Information Management System (CIMS). CIMS contains data on clinic visits of participants in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Pregnant, breastfeeding and postpartum women and children under age five are eligible for WIC if their household income is at or below 185% of the federal poverty level. In 2012, over 320,000 women and children participated in WIC. Fifty percent of all infants born in Washington receive WIC services. At each WIC visit children's weights and heights are measured and body mass index (BMI) is calculated. A child's weight status is determined using an age- and sex-specific percentile for BMI based on World Health Organization growth charts. Children in the 85th to 94th percentiles are considered overweight. Those at the 95th percentile or higher are considered obese. Children are weighed and measured many times over the course of a year. This report uses heights and weights measured at the last visit of the year for children ages two through four years.

WIC margins or error. We have not included margins of error for WIC estimates. All margins of error are less than 1%, except for overweight and obesity for Native Hawaiian and other Pacific Islander children (margin of error: 1.4%) and American Indian and Alaska Native (margin of error: 1.1%)

Comparison to Health People 2010. The 2010 obesity rate for comparison to *Healthy People 2010* is from the combine 2010 cell phone and landline survey using raked and trimmed weights. This is different from the age-adjusted figure in the trend chart that is from the landline survey using post-stratification weighting. (See Caveats in [Appendix B](#), Core Data

Sources, Behavioral Risk Factors Surveillance System.)
The two 2010 figures are also somewhat different because the trend chart includes adults ages 18 and older, while the *Healthy People* goal is for adults ages 20 and older.

Acknowledgments

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Endnotes

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