

Understanding Obesity Statistics: How Are They Measured?

Childhood obesity has gained tremendous attention recently, with reports that rates of childhood obesity in the United States have tripled in the past several decades.¹ This is of particular concern because of the potential impact of obesity on children's physical and emotional well-being. A first step towards improving youth health is to understand what is meant by "overweight" and "obese" and how to interpret obesity statistics.

Using Body Mass Index to Measure Overweight and Obesity in Adults

Attempts to physically measure body fat can be both difficult and expensive, so most analyses rely on Body-Mass Index (BMI). BMI is the ratio of an individual's weight to height squared and approximates a person's body fat content. According to the Centers for Disease Control and Prevention (CDC), individuals over 20 years old who have a BMI over 25 are considered overweight, and those with a BMI over 30 are considered obese. Some organizations use the term severe or morbid obesity to refer to individuals who are more than 100 pounds over a healthy weight or with a BMI greater than 40.

Table 1. Body Mass Index Definitions of Overweight and Obesity for Adults

BMI	Weight Status	Sample weight for a 5'9" individual
Below 18.5	Underweight	124 lbs or less
18.5 – 24.9	Normal	125 lbs to 168 lbs
25.0 – 29.9	Overweight	169 lbs to 202 lbs
30.0 and Above	Obese	203 lbs or more

Source: Centers for Disease Control and Prevention, <http://www.cdc.gov/nccdphp/dnpa/obesity/defining.htm>

Studies have shown that BMI has a high degree of correlation to a true measure of body fat, but it has been criticized for having poorly defined cut-offs, being unable to differentiate between fat and muscle mass, being unable to distinguish between types of fat carried on the body, and perpetuating a focus on obesity over fitness. In addition, adult BMI measurements are not adjusted for age or gender.

Two BMI Measures for Overweight and Obesity in Children

The two major sources of statistics on overweight children in California are the CDC, used most frequently at the national and state levels, and the California Department of Education's (CDE), which can provide estimates at the school, district, county, and state levels. Both rely on BMI but have different ways of using the information to define overweight and obesity. Both the CDC and CDE caution that BMI for children and adolescents should be used strictly as a screening tool and should not be the sole determinant of whether an individual child is considered healthy. They also urge caution in using BMI as height and weight undergo significant changes through puberty.

¹ Ogden CL, Carroll MD, Flegal KM.. High Body Mass Index for Age Among US Children and Adolescents, 2003-2006. *JAMA*. 2008;299(20):2401-2405

CDE Methodology
The CDE uses the California Physical Fitness Test (PFT) to measure each student's BMI. The PFT then determines whether the student has a healthy weight using BMI cut-offs that vary by age and gender. These BMI cut-offs are not the same as the cut-offs listed above for adults.

CDC Methodology
The CDC calculates each child's BMI and then assigns a percentile rank based on the individual's specific age and gender group. Youth above the 95 th percentile are considered overweight, youth above the 85 th percentile are considered at risk of overweight, and youth below the 5 th percentile are considered underweight. Those at or above the 97 th percentile are sometimes referred to as obese or severely overweight.

The following key concepts should be used to help understand these commonly cited obesity statistics:

- **Data sources produce different estimates of overweight youth:** CDC and CDE statistics cannot be directly compared as each uses different age and gender cut-offs to determine what is a healthy weight. These statistics also describe two different populations because the CDC uses a representative sample of all youth in the state and the CDE only includes public-school students in the 5th, 7th, and 9th grades. In addition, the CDE Dataquest website reports students with missing BMI values in the same category as overweight youth, inflating these estimates.²
- **All things equal, CDE estimates of overweight youth will almost always be higher than CDC estimates:** Comparing CDC and CDE cut-offs shows that CDE estimates of overweight youth will almost always be higher than CDC estimates for youth between 9 and 18 years of age. Conversely, CDE estimates of underweight youth will always be lower than CDC estimates for these same youth.
- **Terminology referring to overweight youth can be highly inconsistent:** CDC cut-offs for the 95th and 85th percentile are occasionally mislabeled as obese and overweight instead of the correct designations of overweight and at risk of overweight. Youth who do not meet the CDE cut-offs are officially defined as "needing improvement," but are generally labeled as overweight and sometimes mislabeled as obese.

Implications

BMI is the most commonly applied method to estimate body fat but is less reliable when applied to children or those with high levels of muscle content. Even when measured perfectly, body fat may not be the most appropriate indicator of physical health. Research has found that individuals who are heavy but fit have healthier hearts and lower mortality than those who are normal weight but unfit.³ Nonetheless, the BMI measurements available from the CDE since 2001 and from the CDC for over two decades may serve as a useful tool in approximating trends in youth and adult fitness.

Health organizations could avoid the problems of BMI accuracy by focusing on factors that might contribute to both obesity and poor health. Surveys collected by the CDC and the school-based California Healthy Kids Survey can be used to report a more comprehensive picture of health, including such factors as diet, exercise, food security, smoking habits, neighborhood safety, and self-image. The CDE, which tests students on five different Healthy Fitness Zones in addition to BMI, reports an overall measure of physical fitness which can be linked to data on physical education and out-of-school activities to measure the effects of local efforts on student fitness. Understanding the determinants of poor health in tandem with obesity should help health practitioners and advocates develop better focused strategies to address youth health and well-being.

² Organizations such as the California Center for Public Health Advocacy account for absences and other data issues in their reports, but this has led to an over-reliance on older PFT data.

³ Lee CD, Blair SN, Jackson AS. Cardiorespiratory fitness, body composition, and all-cause and cardiovascular disease mortality in men. *J Am Clin Nutr.* 1999;69:373–380.