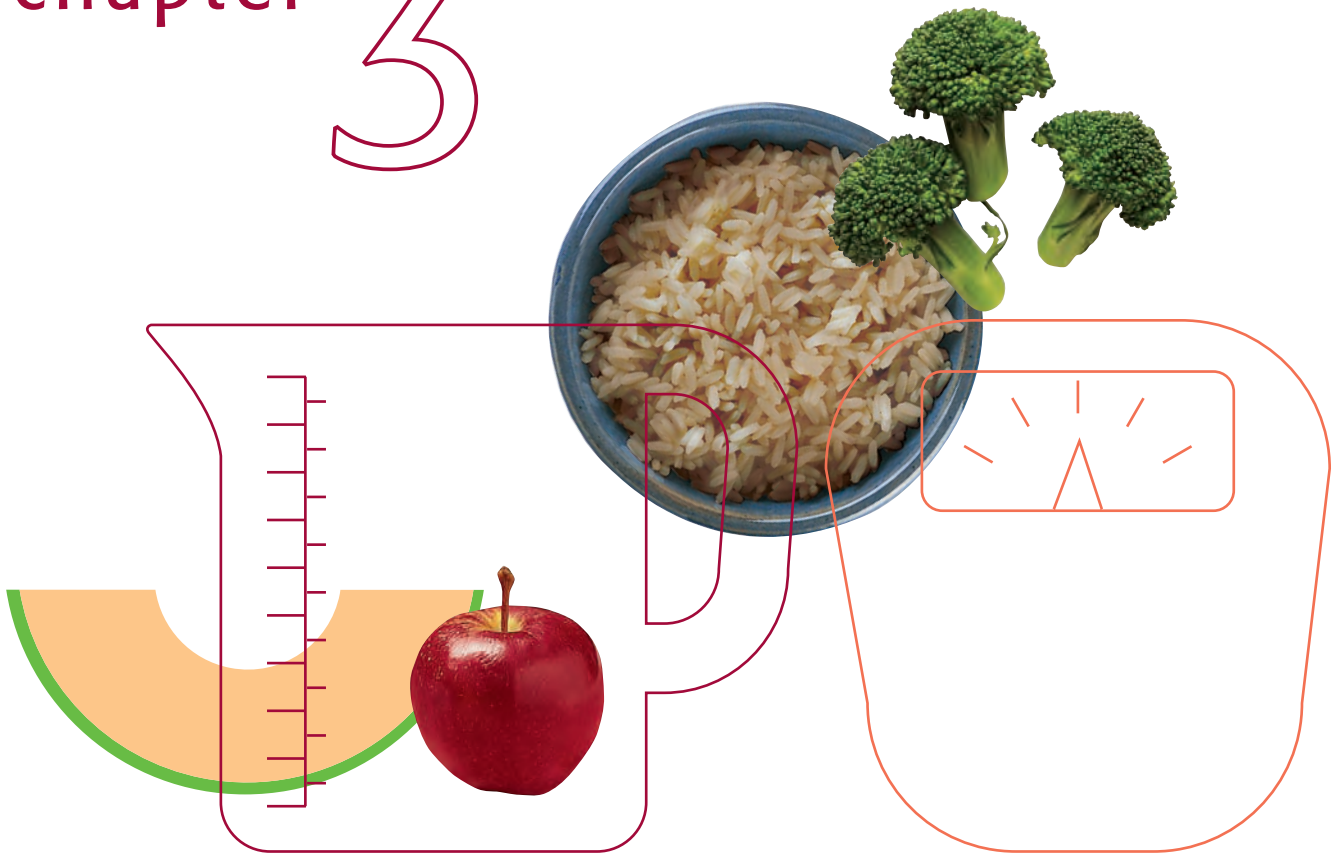


# chapter 3



## Weight Management

### OVERVIEW

The prevalence of obesity in the United States has doubled in the past two decades. Nearly one-third of adults are obese, that is, they have a body mass index (BMI) of 30 or greater. One of the fastest growing segments of the population is that with a BMI  $\geq 30$  with accompanying comorbidities. Over the last two decades, the prevalence of overweight among children and adolescents has increased substantially; it is estimated that as many as 16 percent of children and adolescents are overweight, representing a doubling of the rate among children and tripling of the rate among adolescents. A high prevalence of overweight and obesity is of great public health concern because excess body fat leads to a higher risk for premature death, type 2

diabetes, hypertension, dyslipidemia, cardiovascular disease, stroke, gall bladder disease, respiratory dysfunction, gout, osteoarthritis, and certain kinds of cancers.

Ideally, the goal for adults is to achieve and maintain a body weight that optimizes their health. However, for obese adults, even modest weight loss (e.g., 10 pounds) has health benefits, and the prevention of further weight gain is very important. For overweight children and adolescents, the goal is to slow the rate of weight gain while achieving normal growth and development. Maintaining a healthy weight throughout childhood may reduce the risk of becoming an overweight or obese adult. Eating fewer calories while increasing physical activity are the keys to controlling body weight.



While overweight and obesity are currently significant public health issues, not all Americans need to lose weight. People at a healthy weight should strive to maintain their weight, and underweight individuals may need to increase their weight.

## DISCUSSION

Overweight and obesity in the United States among adults and children has increased significantly over the last two decades. Those following typical American eating and activity patterns are likely to be consuming diets in excess of their energy requirements. However, caloric intake is only one side of the energy balance equation. Caloric expenditure needs to be in balance with caloric intake to maintain body weight and must exceed caloric intake to achieve weight loss (see tables 3 and 4). To reverse the trend toward obesity, most Americans need to eat fewer calories, be more active, and make wiser food choices.

Prevention of weight gain is critical because while the behaviors required are the same, the extent of the behaviors required to lose weight makes weight loss more challenging than prevention of weight gain. Since many adults gain weight slowly over time, even small decreases in calorie intake can help avoid weight gain, especially if accompanied by increased physical activity. For example, for most adults a reduction of 50 to 100 calories per day may prevent gradual weight gain, whereas a reduction of 500 calories or more per day is a common initial goal in weight-loss programs. Similarly, up to 60 minutes of moderate- to vigorous-intensity physical activity per day may be needed to prevent weight gain, but as much as 60 to 90 minutes of moderate-intensity physical activity per day is recommended to sustain weight loss for previously overweight people. It is advisable for men over age 40, women over age 50, and those with a history of chronic diseases such as heart disease or diabetes to consult with a healthcare provider before starting a vigorous exercise program. However, many people can safely increase their physical activity without consulting a healthcare provider.<sup>7</sup>

## KEY RECOMMENDATIONS

- To maintain body weight in a healthy range, balance calories from foods and beverages with calories expended.
- To prevent gradual weight gain over time, make small decreases in food and beverage calories and increase physical activity.

### Key Recommendations for Specific Population Groups

- *Those who need to lose weight.* Aim for a slow, steady weight loss by decreasing calorie intake while maintaining an adequate nutrient intake and increasing physical activity.
- *Overweight children.* Reduce the rate of body weight gain while allowing growth and development. Consult a healthcare provider before placing a child on a weight-reduction diet.
- *Pregnant women.* Ensure appropriate weight gain as specified by a healthcare provider.
- *Breastfeeding women.* Moderate weight reduction is safe and does not compromise weight gain of the nursing infant.
- *Overweight adults and overweight children with chronic diseases and/or on medication.* Consult a healthcare provider about weight loss strategies prior to starting a weight-reduction program to ensure appropriate management of other health conditions.

Monitoring body fat regularly can be a useful strategy for assessing the need to adjust caloric intake and energy expenditure. Two surrogate measures used to approximate body fat are BMI (adults and children) and waist circumference (adults).<sup>8</sup> BMI is defined as weight in kilograms divided by height, in meters, squared. For adults, weight status is based on the absolute BMI level (fig. 2). For children and adolescents, weight status is determined by the comparison of the individual's BMI with age- and gender-specific percentile values (see fig. 3 for a sample boys' growth curve). Additional growth curves can be

<sup>7</sup> For more information on recommendations to consult a healthcare provider, see Physical Activity and Public Health—A Recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine, *JAMA* 273:402-407, 1995. <http://wonder.cdc.gov/wonder/prevguid/p0000391/P0000391.asp>.

<sup>8</sup> NIH Publication Number 00-4084, The Practical Guide: Identification, Evaluation and Treatment of Overweight and Obesity in Adults, U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, October 2000. [http://www.nhlbi.nih.gov/guidelines/obesity/prctgd\\_c.pdf](http://www.nhlbi.nih.gov/guidelines/obesity/prctgd_c.pdf)



found at <http://www.cdc.gov/growthcharts>. BMI is more accurate at approximating body fat than is measuring body weight alone. However, BMI has some limitations. BMI overestimates body fat in people who are very muscular and underestimates body fat in people who have lost muscle mass. The relationship between BMI and body fat varies somewhat with age, gender, and ethnicity. In addition, for adults, BMI is a better predictor of a population's disease risk than an individual's risk of chronic disease.<sup>8</sup> For children gaining excess weight, small decreases in energy intake reduce the rate at which they gain weight (body fat), thus improving their BMI percentile over time. As another surrogate measure, waist circumference can approximate abdominal fat but should be measured very carefully. Fat located in the abdominal region is associated with a greater health risk than peripheral fat.<sup>8</sup>

Some proposed calorie-lowering strategies include eating foods that are low in calories for a given measure of food (e.g., many kinds of vegetables and fruits and some soups). However, when making changes to improve nutrient intake, one needs to make substitutions to avoid excessive calorie intake. The healthiest way to reduce calorie intake is to reduce one's intake of added sugars, fats, and alcohol, which all provide calories but few or no essential nutrients (for more information, see chs. 6, 7, and 9).

Special attention should be given to portion sizes, which have increased significantly over the past two decades (<http://hin.nhlbi.nih.gov/portion/index.htm>). Though there are no empirical studies to show a causal relationship between increased portion sizes and obesity, there are studies showing that controlling portion sizes helps limit calorie intake, particularly when eating calorie-dense foods (foods that are high in calories for a given measure of food). Therefore, it is essential that the public understand how portion sizes compare to a recommended amount of food (i.e., serving) from each food group at a specific caloric level. The understanding of serving size and portion size is important in following either the DASH Eating Plan or the USDA Food Guide (see app. A). When using packaged foods with nutrient labels, people should pay attention

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## Eating fewer calories while increasing physical activity are the keys to controlling body weight.

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to the units for serving sizes and how they compare to the serving sizes in the USDA Food Guide and the DASH Eating Plan.

Lifestyle change in diet and physical activity is the best first choice for weight loss. A reduction in 500 calories or more per day is commonly needed. When it comes to body weight control, it is calories that count—not the proportions of fat, carbohydrates, and protein in the diet. However, when individuals are losing weight, they should follow a diet that is within the Acceptable Macronutrient Distribution Ranges (AMDR) for fat, carbohydrates, and protein, which are 20 to 35 percent of total calories, 45 to 65 percent of total calories, and 10 to 35 percent of total calories, respectively. Diets that provide very low or very high amounts of protein, carbohydrates, or fat are likely to provide low amounts of some nutrients and are not advisable for long-term use. Although these kinds of weight-loss diets have been shown to result in weight reduction, the maintenance of a reduced weight ultimately will depend on a change in lifestyle. Successful and sustainable weight loss and weight maintenance strategies require attention to both sides of the energy balance equation (i.e., caloric intake and energy expenditure).

<sup>8</sup> NIH Publication Number 00-4084, The Practical Guide: Identification, Evaluation and Treatment of Overweight and Obesity in Adults, U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, October 2000. [http://www.nhlbi.nih.gov/guidelines/obesity/prctgd\\_c.pdf](http://www.nhlbi.nih.gov/guidelines/obesity/prctgd_c.pdf)



**TABLE 4. Calories/Hour Expended in Common Physical Activities**

Some examples of physical activities commonly engaged in and the average amount of calories a 154-pound individual will expend by engaging in each activity for 1 hour. The expenditure value encompasses both resting metabolic rate calories and activity expenditure. Some of the activities can constitute either moderate- or vigorous-intensity physical activity depending on the rate at which they are carried out (for walking and bicycling).

Moderate Physical Activity	Approximate Calories/Hr for a 154 lb Person <sup>a</sup>
Hiking	370
Light gardening/yard work	330
Dancing	330
Golf (walking and carrying clubs)	330
Bicycling (<10 mph)	290
Walking (3.5 mph)	280
Weight lifting (general light workout)	220
Stretching	180
Vigorous Physical Activity	Approximate Calories/Hr for a 154 lb Person <sup>a</sup>
Running/jogging (5 mph)	590
Bicycling (>10 mph)	590
Swimming (slow freestyle laps)	510
Aerobics	480
Walking (4.5 mph)	460
Heavy yard work (chopping wood)	440
Weight lifting (vigorous effort)	440
Basketball (vigorous)	440

<sup>a</sup> Calories burned per hour will be higher for persons who weigh more than 154 lbs (70 kg) and lower for persons who weigh less.  
 Source: Adapted from the 2005 DGAC Report.



**FIGURE 2. Adult BMI Chart**

Locate the height of interest in the left-most column and read across the row for that height to the weight of interest. Follow the column of the weight up to the top row that lists the BMI. BMI of 18.5–24.9 is the healthy weight range, BMI of 25–29.9 is the overweight range, and BMI of 30 and above is in the obese range.

BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
<b>Height</b>	<b>Weight in Pounds</b>																
4'10"	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167
4'11"	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173
5'	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179
5'1"	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185
5'2"	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191
5'3"	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197
5'4"	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204
5'5"	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210
5'6"	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216
5'7"	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223
5'8"	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230
5'9"	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236
5'10"	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243
5'11"	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250
6'	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258
6'1"	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265
6'2"	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272
6'3"	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279
	<b>Healthy Weight</b>						<b>Overweight</b>					<b>Obese</b>					

Source: Evidence Report of Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, 1998. NIH/National Heart, Lung, and Blood Institute (NHLBI).



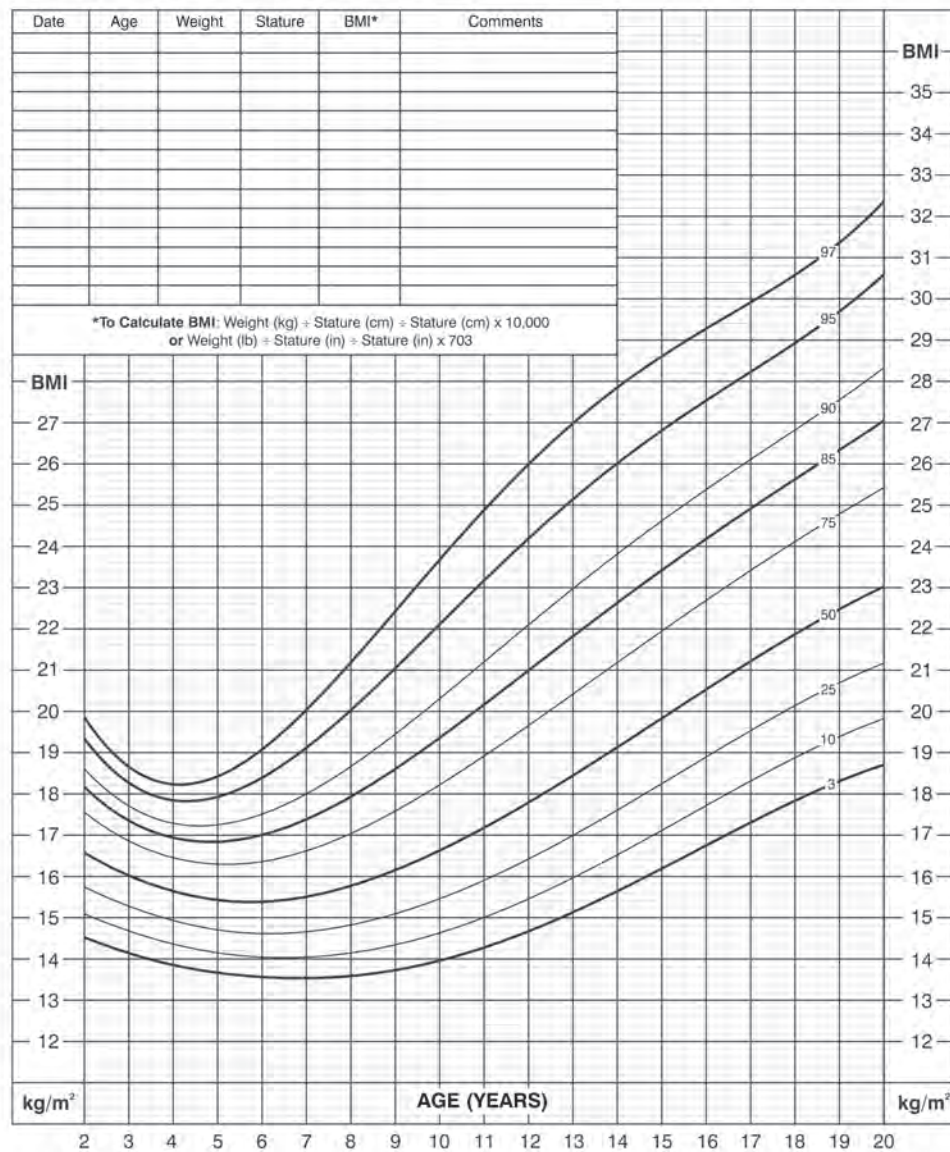
**FIGURE 3. Example of Boys' BMI Growth Curve (2 to 20 years): Boys' Body Mass Index-For-Age Percentiles**

Calculate the BMI for an individual child using the following:

BMI = Weight (kg)/(Height [cm])<sup>2</sup> x 10,000 or BMI = Weight (lb)/(Height [in])<sup>2</sup> x 703

Find the age of the child on the bottom, x-axis, and read up the chart from that age to the calculated BMI on the left and right, y-axis. The curve that is closest to the spot where the age and BMI of the child meet on the graph indicate the BMI percentile for this child relative to the population.

**2 to 20 years: Boys**  
**Body mass index-for-age percentiles**



Published May 30, 2000 (modified 10/16/00).

Source: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion. <http://www.cdc.gov/growthcharts> (2000). Other growth charts are available at this source.