

Topline information for today's family physician

# Diagnosis and Management of Obesity



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# Diagnosis and Management of Obesity

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## A Note About Nomenclature

This monograph uses “healthy eating” and “physical activity” in place of “diet” and “exercise.” This reflects more than a semantic preference. For many people, “diet” and “exercise” have negative connotations. Whereas, “healthy eating” and “physical activity” represent a range of healthy choices intended to improve quality of life and reduce the risk of disease.

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# Learning Objectives

After reading this monograph, physicians should be able to:

1. Include body mass index (BMI) and waist circumference as routine vital signs for identifying patients who are overweight or obese.
2. Implement a systematic and practical approach to the management of overweight and obesity.
3. Use evidence-based interventions to help patients improve their nutrition and physical activity habits.
4. Select and prescribe anti-obesity medications in appropriate patients as adjuncts to lifestyle interventions.
5. Identify patients who are candidates for bariatric surgery and refer as appropriate.

## Key Practice Recommendations

### Recommendations

Screen all adults for obesity. Offer or refer patients with a body mass index (BMI) of 30 kg/m<sup>2</sup> or greater to intensive, multicomponent behavioral interventions.<sup>1</sup>

Screen children 6 years and older for obesity, and offer or refer them to comprehensive, intensive behavioral interventions to promote improvement in weight status.<sup>2</sup>

A 5% to 10% weight loss can reduce risk of heart disease and diabetes and should be encouraged for all patients who are overweight and obese.<sup>3,4</sup>

Consider pharmacotherapy in adults who have not been able to lose weight through diet and physical activity alone and who have:

BMI of 30 kg/m<sup>2</sup> or greater

BMI of 27 kg/m<sup>2</sup> or greater, and obesity-related comorbidity<sup>3,4</sup>

Consider bariatric surgery in adults who have not been able to lose weight through diet and physical activity alone and who have:

BMI of 40 kg/m<sup>2</sup> or greater

BMI of 35 kg/m<sup>2</sup> or greater, and obesity-related comorbidity<sup>3</sup>

Regardless of body weight or weight loss, all patients should be encouraged to be physically active for improved health and weight maintenance.<sup>3</sup>

### Comments

This recommendation applies to all adults, not just those with known cardiovascular risk factors.

Regular physical activity is strongly related to maintaining normal weight. Exercise also mitigates health-damaging effects of obesity, even without weight loss.

1. U.S. Preventive Services Task Force. Screening for and management of obesity in adults. *Ann Intern Med.* 2012;157(5):373-378.

2. U.S. Preventive Services Task Force. Screening for and management of obesity in children and adolescents. [www.uspreventiveservices-taskforce.org/uspstf/uspsschobes.htm](http://www.uspreventiveservices-taskforce.org/uspstf/uspsschobes.htm). Accessed April 18, 2013.

3. National Heart, Lung and Blood Institute. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. [www.nhlbi.nih.gov/guidelines/obesity/ob\\_gdlns.pdf](http://www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.pdf). Accessed April 18, 2013.

4. Institute for Clinical Systems Improvement. Obesity, prevention and management of (Mature Adolescents and Adults). [www.icsi.org/guidelines\\_\\_more/catalog\\_guidelines\\_and\\_more/catalog\\_guidelines/catalog\\_endocrine\\_guidelines/obesity/](http://www.icsi.org/guidelines__more/catalog_guidelines_and_more/catalog_guidelines/catalog_endocrine_guidelines/obesity/)

## Introduction

In 2012, the U.S. Preventive Services Task Force (USPSTF) issued the recommendation that all adults be screened for obesity, and that patients with a body mass index (BMI) of 30 kg/m<sup>2</sup> or greater be offered intensive, multicomponent behavioral interventions.<sup>1</sup> The American Academy of Family Physicians has endorsed the USPSTF recommendation, which is based on evidence that intensive counseling can promote modest sustained weight loss and improved clinical outcomes.<sup>1,2</sup>

The prevalence of obesity exceeds 30% in adults and is associated with increased risk of such serious health problems as cardiovascular disease, type 2 diabetes, and various types of cancer. These comorbid conditions are associated with greater use of health care services among obese patients.<sup>1,2</sup> (*Table 1*)

Obesity is also associated with an increased risk of premature death in adults younger than 65. The leading causes of death in obese adults include ischemic heart disease, diabetes, respiratory diseases, and cancer (i.e., liver, kidney, breast, endometrial, prostate, and colon). Weight loss in obese individuals is associated with a lower incidence of health problems and a reduced risk of premature death.<sup>1</sup>

### Bridging the Gap

Despite clinical guidelines encouraging clinicians to identify and counsel obese and overweight patients, many physicians do not address the issue of weight with their patients, even patients who meet the diagnostic criteria.<sup>1-9</sup>

Many factors complicate efforts to address overweight, obesity, and the promotion of healthier diets and lifestyles. Some barriers identified by physicians include:<sup>3,5-9</sup>

- Insufficient time during visits for screening and counseling
- Lack of available referral services for patients
- Perception that patients will not be willing or able to make lifestyle changes
- Poor reimbursement for nutrition and weight-management counseling
- Reluctance to discuss weight among physicians who are themselves overweight

- Uncertainty about whether interventions will have a positive impact

It is worth noting, however, that multiple studies suggest that physician encouragement can increase patient readiness to make lifestyle changes.<sup>6-9</sup> In addition, research has demonstrated that an increased density of primary care physicians in an area is associated with a decreased prevalence of obesity.<sup>10</sup> Finally, patients themselves desire and expect lifestyle counseling from their physicians.<sup>3</sup>

Given that 80% of U.S. adults regularly see a family physician or other primary care provider, even small successes in the management of overweight and obesity are likely to have far-reaching effects.<sup>3</sup>

Overweight and obesity are chronic diseases with behavioral origins that can be traced back to childhood. Because family physicians see patients of all ages and often care for entire families, they are well positioned to help turn the tide on the obesity epidemic.<sup>7</sup>

**Table 1.**  
**Consequences of Obesity**

Physical	Psychosocial	Functional
Cancer	Depression	Absenteeism from school or work
Cardiovascular disease	Discrimination	Disability
Cholestasis	Low self-esteem	Disqualification from active military/fire/police services
Dyslipidemia	Negative body image	Low physical fitness
Gallbladder disease	Negative stereotyping	Mobility limitations
Glucose intolerance and insulin resistance	Social marginalization	Reduced academic performance
Hepatic steatosis	Stigma	Reduced productivity
Hypertension	Teasing and bullying	Unemployment
Hyperuricemia and gout		
Menstrual abnormalities		
Orthopedic problems		
Reduction of cerebral blood flow		
Sleep apnea		
Type 2 diabetes		

*Institute of Medicine. Accelerating progress in obesity prevention: Solving the weight of the nation. Washington, D.C.: National Academies Press, 2012.*

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## Epidemiology and Impact



Overweight is defined as a **body mass index** (BMI) in the 25 to 29 kg/m<sup>2</sup> range, whereas obesity is a BMI in excess of 30 kg/m<sup>2</sup>. Overweight and obesity result from an energy surplus over time that is stored in the body as fat. How genetic and environmental factors contribute to overweight and obesity is not well understood.<sup>4</sup>

Between 1988 and 2008, the prevalence of obesity increased in adults of all income and education levels. However, women with limited education and lower incomes tend to be at greater risk of obesity. Similarly, obesity affects some racial and ethnic groups more than others. Non-Hispanic blacks have the highest age-adjusted rates of obesity (49.5%), compared with Mexican Americans (40.4%), all Hispanics (39.1%), and non-Hispanic whites (34.3%).<sup>11</sup>

The prevalence of obesity among children and adolescents has also increased, almost tripling since 2000. Approximately 17% of children and adolescents ages 2 to 19 years are obese.<sup>12</sup> There is some reason for optimism, however. Among children ages 2 to 4 years in low-income households, the prevalence of obesity and extreme obesity appear to have decreased slightly between 2003 and 2010.<sup>12,13</sup>

As with adults, there are significant racial and ethnic disparities in obesity prevalence among children and adolescents. Hispanic boys are significantly more likely to be obese than non-Hispanic white boys, and non-Hispanic black girls are significantly more likely to be obese than their non-Hispanic white peers.<sup>12</sup>

### Implications

Some of the leading causes of preventable death among adults are obesity-related conditions such as heart disease, stroke, type 2 diabetes, and some types of cancer (endometrial, breast, colon).<sup>11</sup> Excess weight also increases the risk of liver and gallbladder disease, sleep apnea, osteoarthritis, and gynecologic problems such as infertility.<sup>5-7,14</sup>

Overweight and obesity, and associated health problems, account for a significant amount of U.S. health care spending. In 2008 dollars, medical costs, both direct and indirect, totaled approximately \$147 billion. Direct medical costs include preventive, diagnostic, and treatment services related to obesity. Indirect costs relate to lost income from decreased productivity, restricted activity, and absenteeism, as well as loss of future income due to premature death.<sup>14</sup>

The psychosocial complications of obesity are less studied but no less serious. Adults who are obese are more likely than those of normal weight to face discrimination at work and in other settings. They also experience higher rates of depression and anxiety, but it is not clear whether obesity causes or aggravates mental illness, or whether mental illness and medications to treat it confer a propensity toward weight gain and disordered eating.<sup>15</sup>

## Screening and Diagnosis

The USPSTF recommends that all adults be screened for obesity. Thus, BMI should be measured and recorded at each visit, as with any other vital sign.<sup>1</sup>

Although BMI correlates with the amount of body fat, it must be recognized that BMI does not directly measure body fat, nor does it differentiate fat from muscle. This limits the accuracy of BMI in diagnosing obesity, particularly in the intermediate range, as well as in men and older adults in general. A BMI cutoff of 30 kg/m<sup>2</sup> or greater has good specificity but misses many patients with excess body fat.<sup>16,17</sup>

Nevertheless, BMI is recommended for use in clinical practice as a practical way to identify individuals who are overweight or obese. Furthermore, calculating BMI is still a good way to evaluate changes over time, because incremental increases most likely represent gains in body fat.<sup>4,17,18</sup>

Recognizing that BMI is just one indicator of potential health risks associated with being overweight or obese, the National Heart, Lung and Blood Institute (NHLBI) recommends that physicians also look at the following factors:<sup>4,18</sup>

- Risk factors for diseases associated with obesity, such as high blood pressure and physical inactivity

- Waist circumference as a measure of abdominal adiposity

### Waist Circumference

Abdominal adiposity is an important independent risk factor for cardiovascular disease, type 2 diabetes, dyslipidemia, and hypertension. The NHLBI defines abdominal obesity as:<sup>4</sup>

- Waist circumference greater than 40 in (102 cm) in men
- Waist circumference greater than 35 in (88 cm) in women

Individuals with larger waist circumferences have more than a fivefold greater risk of multiple cardiometabolic risk factors, even after adjusting for BMI, compared with individuals with waist measurements in the normal range.<sup>19</sup>

As with BMI, waist circumference should be assessed regularly.<sup>4,18</sup> While some physicians may be reluctant to measure waist size because of a perception that it may embarrass patients, this is not a concern voiced by many patients. Rather, patients want an explanation about what the measurement involves and why it is necessary.<sup>20</sup> Although there is no universally accepted method for measuring waist circumference, federal guidelines recommend measuring at the superior border of the iliac crest.<sup>4,21-23</sup>

### Medications That Promote Weight Gain

Assessment of the obese patient should include a complete medication history. Many agents, including beta blockers, corticosteroids, diabetes drugs, and psychoactive drugs, are known to cause weight gain. Most of these medications cause weight gain by increasing appetite. Prescribing these medications may be unavoidable, but patients should be told that weight gain is a side effect and encouraged to take steps to prevent it (e.g., increase physical activity).

<b>Anticonvulsants</b>	<b>Antihypertensives</b>	<b>Antipsychotics</b>	<b>Corticosteroids</b>
Valproic acid	Clonidine	Chlorpromazine	<b>Psychotropics</b>
Carbamazepine	Guanabenz	Thiothixene	Lithium
<b>Antidepressants</b>	Methyl dopa	Haloperidol	<b>Sulfonylureas</b>
Amitriptyline	Prazosin	Olanzapine	Glipizide
Imipramine	Terazosin	Clozapine	Glyburide
Phenelzine	Propranolol	Risperidone	
	Nisoldipine	Quetiapine	

*Adapted from Kolasa KM, Collier DN, Cable K. Weight loss strategies that really work. J Fam Pract. 2010;59(7):378-385.*

Abdominal obesity is also one of five diagnostic criteria for metabolic syndrome. Approximately 34% of adults meet the criteria for metabolic syndrome, and the risk increases with age. Men ages 60 years or older are more than four times as likely and women ages 60 years and older are more than six times as likely to be diagnosed with metabolic syndrome compared with younger adults (ages 20 to 39 years).<sup>24</sup>

### Additional Evaluation

Most cases of obesity are not due to a medical disorder, but rather to a combination of hereditary predisposition and lifestyle factors. Nevertheless, the initial evaluation should include a review of the medication list and a thorough medical history, including age at onset of weight gain, previous weight-loss efforts, dietary and exercise habits, and history of smoking.<sup>18,20</sup>

In patients with a BMI of 25 kg/m<sup>2</sup> or greater, or a waist circumference greater than 35 in (88 cm) in women or 40 in (102 cm) in men, further evaluation of risk factors is required. Blood pressure and lipid levels should be measured, and fasting glucose tested.<sup>4,18,21</sup> (Table 2)

The presence of established coronary heart disease, other atherosclerotic diseases, cardiovascular risk factors, type 2 diabetes, or sleep apnea increases the risk for complications and premature mortality.<sup>4,21</sup> The presence of three or more of the following risk factors confers a high absolute risk:<sup>4</sup>

- Age 45 years or older for men or 55 years or older for women
- Cigarette smoking
- Family history of premature coronary heart disease (myocardial infarction or sudden death at or before age 55 years in father or age 65 years in mother)
- High-density lipoprotein (HDL) cholesterol less than 35 mg/dL
- Impaired fasting glucose (110 to 125 mg/dL)
- Hypertension (systolic blood pressure 140 mm Hg or greater or diastolic blood pressure 90 mm Hg or greater)
- Low-density lipoprotein (LDL) cholesterol 160 mg/dL or greater

Addressing modifiable cardiovascular risk factors is an important addition to weight-reduction therapy. Amelioration of risk factors will reduce the risk for cardiovascular disease

**Table 2.**  
**Classification of Overweight and Obesity, and Associated Disease Risk**

Classification*	BMI (kg/m <sup>2</sup> )	Obesity Stage	Disease Risk (Relative to Normal Weight and Waist Circumference)†	
			Waist Circumference Men: ≤40 in (102 cm) Women: ≤35 in (88 cm)	Waist Circumference Men: >40 in (102 cm) Women: >35 in (88 cm)
Underweight	<18.5	—	—	—
Normal	18.5 to 24.9	—	—	—
Overweight	25.0 to 29.9	—	Increased	High
Obesity	30.0 to 34.9	I	High	Very high
	35.0 to 39.9	II	Very high	Very high
Extreme obesity	≥40.0	III	Extremely high	Extremely high

BMI = body mass index.

\*For persons 20 years and older.

† Disease risk for type 2 diabetes mellitus, hypertension, and cardiovascular disease. Increased waist circumference can be a marker for increased disease risk, even in persons of normal weight.

National Heart, Lung, and Blood Institute. Classification of overweight and obesity by BMI, waist circumference, and associated disease risks. [www.nhlbi.nih.gov/health/public/heart/obesity/lose\\_wt/bmi\\_dis.htm](http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/bmi_dis.htm). Accessed March 1, 2013.

regardless of whether efforts to lose weight are successful.<sup>4</sup>

Conditions such as osteoarthritis, gallstones, stress incontinence, amenorrhea, and menorrhagia are also associated with obesity and are often the reasons patients visit their physicians.<sup>4</sup> These visits provide a valuable opportunity to help patients understand the connections between nutrition, physical activity, and health. For example, an office visit during which an overweight patient complains of knee pain or is diagnosed with sleep apnea may be a “teachable moment” in which the patient is likely to be receptive to the idea of making healthier choices.<sup>9</sup>

### Metabolic Syndrome

Metabolic syndrome is a constellation of risk factors, including abdominal obesity, atherogenic dyslipidemia, elevated blood pressure, and elevated plasma glucose levels, that increase the risk of cardiovascular disease. *Table 3* lists five criteria for metabolic syndrome, three of which must be present to make the diagnosis.<sup>24,25</sup>

The predominant underlying risk factors for metabolic syndrome are abdominal obesity and insulin resistance. Although many patients may be genetically susceptible to metabolic syndrome, it rarely develops in the absence of obesity and physical inactivity. Consequently, the key emphasis in management is mitigation of modifiable risk factors, specifically obesity, physical inactivity, atherogenic diet, and smoking, through lifestyle changes.<sup>26</sup>

**Table 3.**  
**Diagnostic Criteria for Metabolic Syndrome\***

Measure (any 3 of 5 criteria constitute diagnosis of metabolic syndrome)	Categorical Cut Points
Elevated waist circumference	>102 cm (>40 in ) in men >88 cm (>35 in) in women
Elevated TG	>150 mg/dL (1.7 mmol/L) or drug treatment for elevated TG
Reduced HDL-C	<40 mg/dL (1.03 mmol/L) in men <50 mg/dL (1.3 mmol/L) in women or drug treatment for reduced HDL-C
Elevated BP	>130 mm Hg systolic >85 mm Hg diastolic or drug treatment for hypertension
Elevated fasting glucose (or treatment for elevated fasting glucose)	>100 mg/dL (5.6 mmol/L) or drug treatment for elevated glucose

*BP = blood pressure; HDL-C = high-density lipoprotein cholesterol; TG = triglycerides.*

*\*Three of the criteria must be present to make the diagnosis.*

*Reprinted with permission from Grundy SM, Cleeman JI, Daniels SR, et al. Diagnosis and management of the metabolic syndrome. Circulation. 2005; 112(17):2735-2752.*

Informing a patient that he or she has metabolic syndrome can generate a valuable counseling opportunity. For example, understanding the likely progression from metabolic syndrome to type 2 diabetes may motivate patients to take steps to reduce their weight and increase their physical activity.<sup>9</sup>

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## Approach to Management

The connection between excess body fat and health risks such as type 2 diabetes, hypertension, dyslipidemia, and coronary heart disease has been well-documented and provides the rationale for management of obesity.<sup>4</sup> Although significant weight loss may be ideal, even a modest reduction in weight (5% to 10% of total body weight) can have significant health benefits.<sup>4,27</sup>

Support for aggressively pursuing lifestyle modification in high-risk individuals comes in part from the Diabetes Prevention Program (DPP), a rigorously conducted randomized trial that compared usual care, metformin use (850 mg two times per day), and intensive lifestyle modification in more than 3,000 individuals with impaired glucose tolerance.<sup>28,29</sup> The goal of the intensive lifestyle program in DPP was to help patients lose a minimum of 7% of their body weight and add a minimum of 150 minutes of exercise per week. Behavioral interventions included meeting with individual case managers, group and individual counsel-

ing sessions, self-management training, individualized adherence strategies, and clinical support. In the trial, intensive lifestyle modification decreased progression to diabetes by nearly 60% while metformin resulted in a 31% decrease, compared with usual care.<sup>28-30</sup>

Although many family physicians are pessimistic about their ability to influence patients to make necessary lifestyle changes in order to achieve weight loss, research suggests that patients are more likely to attempt weight loss when their primary care physicians recommend it.<sup>6,9,27</sup> For example, a recent study found that patients who had been told by a physician that they were overweight had a more realistic perception of their weight and were more likely to express interest in losing weight.<sup>9</sup> In another study, patients who lost weight credited their physicians with having helped them by explaining the health risks of obesity, making physical activity recommendations, and providing referrals to weight-loss groups or programs.<sup>6</sup>

## Behavioral Treatment

The goal of behavioral therapy is to enable patients to reduce and manage their weight by monitoring and modifying their food intake, increasing their physical activity level, and recognizing and controlling cues that trigger overeating. Behavioral-based treatment programs have been shown to improve weight-loss results, whether administered individually or in a group setting, at least in the short term. A 2010 USPSTF evidence review found that behavioral interventions result in an average of 6% reduction in body weight, compared with little or no weight loss in a usual-care group after one year. In addition, higher treatment intensity was associated with greater weight loss. Higher-intensity interventions include self-monitoring, goal setting, and planning to address barriers to maintaining lifestyle changes over time.<sup>1,30,31</sup>

The USPSTF developed the stepwise framework known as the 5 A's (ask, advise, assess, assist, and arrange) for the delivery of preventive counseling in primary care.<sup>32</sup> This construct is easily applied to obesity-related counseling as well.<sup>18,27,32-34</sup> (Table 4)

Although the 5 A's approach is helpful for patients who are ready to change, it may not work as well for patients who are ambivalent or hesitant about making lifestyle changes. With these patients, motivational interviewing may be a better approach.<sup>34</sup>



**Motivational interviewing** helps patients discover their motivation to change by exploring and resolving feelings of ambivalence. In motivational interviewing, physicians ask questions that lead patients to identify healthy choices that they want to make. Telling patients that they are overweight and must diet often leads to defensiveness and resistance. In contrast, asking patients how they feel about their current weight gives them an opportunity for self-examination that may lead to the realization that they can do more to improve their health.<sup>34,35</sup> (Table 5)

Physicians can help motivated patients identify specific, measurable, and realistic goals to decrease calorie intake and increase physical activity.<sup>18,27</sup> During follow-up visits, progress toward goal achievement should be assessed, and additional support and education provided

as appropriate. Imperfect goal attainment is to be expected and should be handled with empathy and tact. This can be achieved by communicating that the goal, not the patient, is at issue. It's crucial to focus on positive changes and take a problem-solving approach to help

**Table 4.**  
**The 5 A's for Evaluation and Treatment of Obesity**

<b>Assess</b>	Severity of obesity with calculated BMI, waist circumference, and comorbidities
	Food intake and physical activity in context of health risks and appropriate dietary approach
	Medications that affect weight or satiety
	Readiness to change behavior and stage of change
<b>Advise</b>	Diagnosis of overweight, obese, or severe obesity
	Caloric deficit needed for weight loss
	Various types of diets that lead to weight loss and ease of adherence
	Appropriateness, cost, and effectiveness of meal replacements, dietary supplements, over-the-counter weight aids, medications, surgery
<b>Agree</b>	Importance of self-monitoring
	If patient is not ready, discuss at another visit
	If patient is motivated and ready to change, develop treatment plan
	If patient chooses diet, physical activity, and/or medication, set weight-loss goal at 10% from baseline
<b>Assist</b>	If patient is a potential candidate for surgery, review options
	Provide a diet plan, physical activity guide, and behavior-modification guide
	Provide Web resources based on patient interest and need
	Identify method for self-monitoring (e.g., diary)
<b>Arrange</b>	Review food and activity diary on follow-up (reassess if initial goal is not met)
	Follow-up appointments to meet patient needs
	Referral to registered dietitian and/or behavioral specialist for individual counseling/monitoring or weight-management class
	Referral to surgical program
	Maintenance counseling to prevent relapse or weight regain

BMI = body mass index.

Reprinted with permission from Kolasa KM, Collier DN, Caleb K. Weight loss strategies that really work. *J Fam Pract.* 2010;59(7):378-385.

**Table 5.**  
**Components and Examples of Motivational Interviewing**

Component	Sample Statements	Rationale
Agenda setting	“Would you mind if I talked with you about your weight?”	Asking permission emphasizes patient autonomy
Exploration		
Patient’s desire	“Are you interested in being more active?”	Assesses value of changing
Patient’s ability	“Would you be able to walk for 30 minutes each day?”	Assesses patient self-efficacy
Patient’s reasons	“You mentioned that you’re now more open to adding exercise to your routine. What makes you open to it now?”	Assesses current sources of motivation
Patient’s need	“How important is it that you get more fit?”	Assesses degree of motivation
Providing information	“Obesity has been linked to a greater risk of diabetes and heart disease. Losing even a modest amount of weight can lower your risk. There are several options available to help you.”	Conveys hope; relates risk behavior to long-term health outcomes; indicates that there are treatment options
Listening and summarizing	“What do you think about that idea?” “It sounds like you are interested in seeing a dietitian for nutrition advice but are worried about finding the right one.”	Elicits view of personal health risk and acceptable interventions; identifies sources of ambivalence
Generating options and contracting	“It sounds like you have several good ideas about how to reduce your calorie intake. Which one do you think would work best? I look forward to hearing about it at our next appointment.”	Patient selects specific plan, which will be reevaluated at an agreed-on time

*Adapted from Searight R. Realistic approaches to counseling in the office setting. Am Fam Physician. 2009;79(4):277-284.*

patients overcome setbacks.<sup>4</sup> In the end, long-term success depends on the degree to which patients embrace the goals, and the extent to which the goals satisfy their needs for autonomy and competency.<sup>35,36</sup>

### Self-Monitoring

Self-monitoring is associated with improved outcomes and is a key element in any successful behavioral weight-loss program. Patients are asked to observe and record target behaviors. Self-monitoring tools include **food diaries, physical activity logs**, and weight records.<sup>4,18,30,33</sup>



Self-monitoring is less about accuracy in reporting and more about helping patients identify patterns of behavior.<sup>33</sup> According to data from the National Weight Control Registry, self-monitoring is one of the techniques frequently used by patients who are successful in maintaining weight loss.<sup>30,37,38</sup> Indeed, patients often rank self-monitoring as one of the most helpful weight-loss tools,<sup>33</sup> and the addition of free or low-cost smart phone applications and online calorie-tracking programs has made self-monitoring infinitely easier.

### Stimulus Control

Another key to successful weight loss is stimulus control — identifying and modifying cues that trigger unhealthy habits such as overeating and inactivity. Learning to control these cues is helpful not only for short-term weight loss but also for long-term maintenance.<sup>33</sup>

Physicians should work with patients to develop practical, individualized stimulus-control strategies. Examples of such strategies include eating only at the dining table; not eating while watching television; not keeping snack foods at home; and putting out workout clothes at night as a reminder to exercise in the morning.<sup>33</sup>

Although the evidence is less robust, the following behavioral tools may also increase the likelihood of success with weight-loss efforts:<sup>8,30,34</sup>

- Cognitive restructuring — changing negative thought patterns such as “all or nothing” thinking that undermine efforts at behavior change
- Problem solving — anticipating challenging situations and preparing strategies for dealing with them
- Stress management — identifying and reducing life stressors when possible and

developing strategies for coping with unavoidable causes of stress

Behavioral interventions in conjunction with dietary or drug therapy are more effective than routine care alone. This finding has been documented in multiple studies, including the DPP.<sup>28,29</sup> It has also been demonstrated in the primary care setting by a randomized trial that compared usual care (quarterly office visits), brief lifestyle counseling (monthly sessions with lifestyle coaches in addition to quarterly office visits), and enhanced lifestyle counseling (quarterly visits, brief lifestyle counseling, and meal replacement or pharmacotherapy). Outcomes were significantly better in the enhanced lifestyle counseling group compared with the usual-care group.<sup>39</sup>

## Nutrition Counseling

Taking a nutrition and physical activity history is an important step in helping overweight and obese patients identify and adapt healthier behaviors.<sup>4,18</sup>

Many excellent resources exist to help patients make healthier food choices and manage their weight. One such resource is the website [www.ChooseMyPlate.gov](http://www.ChooseMyPlate.gov), which is based on the 2010 Dietary Guidelines for Americans.<sup>40</sup> The website includes interactive tools for patients to determine calorie needs for weight loss or maintenance, as well as calorie trackers and menu planners. Patients who are interested in more in-depth education can be referred to a registered dietitian for counseling (if that resource is not available in the family physician's office). The Academy of Nutrition and Dietetics (formerly the American Dietetic Association) is a resource for finding registered dietitians.

Another excellent resource for physicians is the Weight Management Research to Practice Series from the Centers for Disease Control and Prevention (CDC). This series summarizes the evidence base for dietary recommendations such as controlling portion sizes, increasing fruit and vegetable consumption, and decreasing saturated fat. These summaries often include patient education materials. When discussing these recommendations with patients, it is essential to convey that these tips will aid weight loss only when accompanied by an overall reduction in caloric intake.<sup>27,41</sup>

When patients ask which diet to follow, physicians can reassure them that a reduced-calorie diet can result in meaningful weight loss regardless of which macronutrients it emphasizes. Any of the popular diets, including low-carbohydrate and low-fat diets, can be effective if they lead to reduced caloric intake. Meal-replacement diets in particular have been shown to lead to weight loss, because they make it easier for patients to limit calories. Ultimately, the best diet is one that the patient will be able to follow consistently over time.<sup>27,41-46</sup>

National Heart, Lung and Blood Institute guidelines suggest that patients who want to lose weight reduce their caloric intake by 500 to 1,000 kcal per day to produce a weight loss of 1 to 2 lb (0.45 to 0.90 kg) per week.<sup>4</sup> It is now recognized, however, that calculating the dynamics of energy imbalance to predict changes in body weight is not as straightforward as once thought. Adding to the difficulty is the reality that weight loss leads to a reduction in energy expenditure.<sup>45,47</sup>

In one study, for example, obese patients who lost 10% of their baseline weight experienced a 15% reduction in energy expenditure compared with that predicted by body composition.<sup>48</sup> Patients experience this dynamic when they hit the so-called weight-loss plateau and are frustrated to find that simply following the approach that led to their initial weight loss does not result in additional weight loss. To

### Lessons From the National Weight Control Registry

Patients need reassurance that they can be successful in managing their weight. Thus, it may be helpful to share data from the National Weight Control Registry. The registry includes individuals who have lost an average of 67 pounds and maintained the weight loss for an average of 5 years by making permanent changes to diet and physical activity levels.

Individuals who lost weight and maintained the weight loss had the following habits in common:

- Being physically active for at least 60 to 90 minutes per day
- Eating a lowfat diet that is rich in complex carbohydrates
- Eating breakfast every day
- Weighing themselves frequently (most at least weekly)

*Adapted from Klem ML, Wing RR, McGuire, et al. A descriptive study of individuals successful at long-term maintenance of substantial weight loss. Am J Clin Nutr. 1997;66:239-246; Schick SM, Wing RR, Klem ML, et al. Persons successful at long-term weight loss and maintenance continue to consume a low-calorie, low-fat diet. J Am Dietetic Assoc. 1998;98:408-413.*

continue losing weight, patients must further reduce their caloric intake and/or increase their activity level.<sup>4,45,46</sup>

### **Commercial Weight-Loss Programs**

Many patients join commercial weight-loss programs such as Weight Watchers, TOPS, Jenny Craig, Slim for Life, and Overeaters Anonymous. These programs are appealing because of the social and emotional support they provide. However, commercial weight-loss programs can be expensive and only occasionally have been evaluated in long-term clinical trials.<sup>30,49-52</sup> Although evidence of effectiveness may be limited, commercial programs do not appear to carry any greater risks than other dietary approaches. Therefore, patients can be encouraged to choose the program they feel is best suited to their needs and that can be integrated into their lifestyle.<sup>30</sup>

### **Physical Activity**

Physicians should routinely recommend regular physical activity to all patients, not only to those who are overweight or obese.<sup>18,53,54</sup> The American College of Sports Medicine has begun an initiative to recommend that assessment of physical activity be considered a vital sign and be incorporated into routine health screening and maintained in the medical record.<sup>55</sup>

The 2008 Physical Activity Guidelines for Americans recommend that adults perform at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic activity per week (or an equivalent combination of these). Aerobic activity should be performed for at least 10 minutes per session and should be spread throughout the week. For additional health benefits, adults should increase their aerobic physical activity to 300 minutes of moderate-intensity or 150 minutes of vigorous-intensity aerobic activity per week. Adults should also engage in muscle-strengthening activities of moderate to high intensity that involve all major muscle groups on two or more days per week.<sup>53</sup>

Adding physical activity to calorie restriction may result in modest improvements in weight loss.<sup>4</sup> Physical activity alone, however, has not been shown to be sufficient in producing significant weight loss, except at very high

intensity levels.<sup>4,41,54,56</sup> Even without weight loss, however, exercise can mitigate the damaging effects of obesity and a sedentary lifestyle.<sup>41,53,57</sup> Increasingly, “sitting time” is being recognized as an independent risk factor for the development of metabolic risk factors. This appears to be true even in individuals who achieve the recommended amount of physical activity per week if they are sedentary for long periods during the day.<sup>56</sup>

It is important to reassure patients that the health benefits of physical activity outweigh possible adverse outcomes. Adults with very low fitness levels can start with 10-minute increments of light-intensity aerobic activity such as walking. Duration and intensity can be increased over time as fitness improves. All activities — not just formal exercise — count and can be beneficial for weight control. Small changes that most patients can incorporate into their regular routines include taking the stairs rather than the elevator; parking at a distance from the mall, supermarket, or work entrance; and adding short periods of walking to the day.<sup>53</sup>

With regard to weight control, however, vigorous-intensity activity is far more time-efficient than moderate-intensity activity. For example, an adult who weighs 165 lb (75 kg) will burn 560 calories from 150 minutes of brisk walking at 4 miles per hour (these calories are in addition to the calories normally burned by a body at rest). That person can burn the same number of calories in 50 minutes by running 5 miles at a pace of 6 miles per hour.<sup>53</sup> This example also illustrates why physical activity alone is not sufficient to produce weight loss. While 560 calories is easily consumed, it is not easily expended and, although data is mixed with respect to the relationship between appetite and exercise, most people experience a subjective increase in appetite with the addition of exercise to their lifestyle.

Physical exercise and activity are particularly important for maintaining weight loss over the long term (and for preserving lean body mass during dieting).<sup>30,41,54</sup> Maintenance of weight loss has a graded relationship to the amount of exercise that individuals need after weight loss.<sup>54</sup> Thus, patients who have lost considerable weight may need to engage in higher amounts (more than 300 minutes a week) or more vigorous exercise to maintain their weight loss.<sup>53,56</sup>

## Pharmacotherapy

Prescription anti-obesity drugs can be useful adjuncts to diet and exercise for obese adults who have failed to achieve weight loss with diet and exercise. Prescription weight-loss drugs are approved for patients who meet the following criteria:<sup>18,58</sup>

- BMI of 30 kg/m<sup>2</sup> or greater
- BMI of 27 kg/m<sup>2</sup> or greater and an obesity-related condition (such as hypertension, type 2 diabetes, or dyslipidemia)

In meta-analyses of randomized trials comparing pharmacologic therapy with placebo, all drug interventions were effective in reducing weight compared with placebo. Many of the trials, however, were of short duration and had high attrition rates. In addition, few trials have involved direct comparisons of individual agents. Thus, physicians must use clinical judgment in drug selection, weighing the potential benefits and risks of the various agents in light of each patient's risk factors and comorbidities.<sup>59</sup>

It is also essential to keep in mind that while pharmaceutical agents can help patients achieve clinically meaningful weight loss, the medications must generally be continued to maintain the reduction.<sup>41</sup> Three prescription medications are currently approved for long-term management of obesity: orlistat (Xenical), lorcaserin (Belviq), and combination phentermine-topiramate extended release (Qsymia). Several sympathomimetic drugs are available for short-term use.<sup>59-63</sup> (Table 6)

### Orlistat

Orlistat was approved by the Food and Drug Administration (FDA) in 1999 for weight loss and weight maintenance in conjunction with a reduced-calorie diet.<sup>64</sup> Orlistat inactivates gastric and pancreatic lipases, reducing the absorption of fat by the gastrointestinal tract by approximately 30%.<sup>32,58,59,61,62</sup> Orlistat is also available without a prescription in a reduced-strength product called Alli.

The effectiveness of orlistat has been demonstrated in several randomized trials.<sup>1,59</sup> A meta-analysis of trials that included patients with and without diabetes found that patients assigned to orlistat plus behavioral interventions lost 8% of baseline weight compared with 5% in the control group after 12 to 18 months. In this analysis, orlistat plus behavioral interventions resulted in a weight loss of 6.6 lb (3 kg) more than placebo and behavioral interventions.<sup>31,59</sup> Orlistat also has beneficial effects on blood pressure, insulin resistance, and lipid levels.<sup>61,62</sup>

The predominant adverse effects of orlistat are gastrointestinal and include diarrhea, abdominal cramping, fecal incontinence, oily spotting, and flatus with discharge.<sup>58,62,64</sup> These adverse effects tend to occur early in therapy and then subside as patients adjust to limiting dietary fat to no more than 30%. Patients should be advised to take a multivita-

**Table 6. Anti-obesity Medications Approved for Long-term Use**

Drug	Mechanism of Action	Possible Adverse Effects
Lorcaserin (Belviq)	Decreases appetite, increases feeling of fullness	Headache, dizziness, fatigue, nausea, dry mouth, constipation
Orlistat (Xenical)	Blocks absorption of fat	Intestinal cramps, gas, diarrhea, oily spotting
Phentermine and topiramate extended-release (Qsymia)	Decreases appetite, increases feeling of fullness	Increased heart rate, birth defects, tingling of hands and feet, insomnia, dizziness, constipation, dry mouth

*Adapted from Prescription medications for the treatment of obesity. [win.niddk.nih.gov/publications/prescription.htm](http://win.niddk.nih.gov/publications/prescription.htm); Accessed April 17, 2013. Bray GA. Drug therapy of obesity. [www.UpToDate.com](http://www.UpToDate.com). Accessed March 1, 2013; Allison DB, Gadde KM, Garvey WT, et al. Controlled-release phentermine/topiramate in severely obese adults. *Obesity*. 2012;20(2):330-342.*

min that contains fat-soluble vitamins to offset potential losses from fecal fat excretion.<sup>59,64</sup>

Orlistat is often used as initial therapy because of its effectiveness and long-term safety record. However, there have been rare reports of severe liver disease with orlistat. Although a cause-and-effect relationship has not been established, the FDA required that the product label be revised to include information about the risk of severe liver injury.<sup>59,62,64</sup> Orlistat is estimated to cost approximately \$150 per month.<sup>65</sup>

### Lorcaserin

Lorcaserin is indicated as an adjunct to a reduced-calorie diet and increased physical activity for chronic weight management. Lorcaserin is a serotonin 2C receptor agonist and is thought to aid weight loss by reducing appetite and promoting satiety.<sup>66</sup> The FDA approved lorcaserin in 2012, although it initially denied approval because of concerns that the potential risks of the drug outweighed the benefits. Nonselective serotonergic agonists, such as fenfluramine and dexfenfluramine, carry an increased risk of serotonin-associated cardiac valvular disease. Theoretically, lorcaserin should not have the same cardiac effects because it is a selective agonist of serotonin receptor 2C. However, there are currently few long-term safety data.<sup>59-62</sup>

Lorcaserin appears to have comparable effectiveness to orlistat but to be slightly less effective than phentermine-topiramate.<sup>59-62</sup> Lorcaserin's safety and effectiveness were evaluated in three randomized, placebo-controlled, double-blind studies that were the basis for FDA approval. These trials included more than 6,000 patients and lasted at least one year. The average weight loss with lorcaserin ranged from 3% to 3.7% over placebo. In the two trials that excluded patients with diabetes, approximately 47% of participants lost at least 5% of their body weight, compared with 23% for placebo.<sup>66,67</sup>

Lorcaserin appears to have fewer adverse effects than orlistat, although long-term data are limited.<sup>59-62</sup> The most common adverse effects with lorcaserin include headache, dizziness, fatigue, nausea, dry mouth, and constipation.<sup>66</sup>

Like orlistat, lorcaserin is indicated for obese patients with at least one weight-related comorbidity such as diabetes, hypertension, or dyslipidemia. Response to lorcaserin should be assessed at 12 weeks, and the medication should be discontinued if patients do not lose 5% of their body weight.<sup>59-62,66</sup>

Although lorcaserin was approved in 2012, as of April 1, 2013, it was not yet available pending a decision to designate lorcaserin as a Schedule IV controlled substance.<sup>68,69</sup> When it is available, lorcaserin is expected to cost approximately \$120 per month.<sup>65</sup>

### Phentermine-Topiramate ER

The combination of phentermine and topiramate extended-release is another recent addition to the approved medical options for chronic weight management. Phentermine is an appetite suppressant and topiramate is an anticonvulsant thought to act as an appetite suppressant.<sup>70</sup> Like lorcaserin, phentermine-topiramate was not approved by the FDA when it was first submitted. Concerns were raised about potentially serious adverse effects, such as increased heart rate, depression, suicidal ideation, and cognitive impairment.<sup>62</sup>

Phentermine-topiramate ER was evaluated for safety and effectiveness in two large randomized, double-blind, placebo-controlled trials. These trials included 3,700 patients treated for up to one year. The average weight loss in patients taking phentermine-topiramate ER ranged from 6.7% (lowest dose) to 8.9% (recommended dose) over placebo. Sixty-two percent of patients taking the lowest dose and 70% taking the recommended dose lost at least 5% of their body weight, compared with 20% of patients receiving placebo.<sup>67,71</sup>

Phentermine-topiramate ER appears to be slightly more effective than orlistat and lorcaserin. However, concerns about phentermine-topiramate ER's effect on heart rate limit its use in patients with cardiovascular disease.<sup>59</sup> The most common adverse effects with phentermine-topiramate ER include paraesthesia, dizziness, dysgeusia, insomnia, constipation, and dry mouth.<sup>70</sup>

After 12 weeks, if a patient has not lost at least 3% of baseline body weight, phentermine-topiramate ER may be discontinued, or the

dosage may be increased. In the latter case, weight loss should be reevaluated after an additional 12 weeks. If 5% weight loss has not been achieved at that point, the drug should be discontinued. Phentermine-topiramate ER should be discontinued gradually because abrupt cessation of topiramate has been associated with seizures in some patients.<sup>70,71</sup> Combination phentermine-topiramate is estimated to cost approximately \$180 per month.<sup>65</sup>

Any agent that contains phentermine is designated as a Schedule IV controlled substance. Because of the teratogenic risk associated with this therapy, physicians who wish to prescribe phentermine-topiramate ER must be enrolled in a risk evaluation and mitigation strategy (REMS) program.<sup>70,71</sup>

### **Sympathomimetics**

Four sympathomimetic agents are currently approved for short-term use as weight-loss adjuncts: phentermine, diethylpropion, benzphetamine, and phendimetrazine. Phentermine and diethylpropion are Schedule IV drugs, while benzphetamine and phendimetrazine are

Schedule III drugs.<sup>59,63</sup>

Sympathomimetic agents demonstrate a modest weight-loss benefit by causing early satiety. However, evidence is lacking about the long-term risks and benefits of these medications. These agents are contraindicated in patients with coronary heart disease, hypertension, hyperthyroidism, and in patients with a history of drug abuse. For these reasons, primary care physicians may choose to avoid prescribing them in favor of other agents.<sup>59,63</sup>

### **Other Medication Options**

An alternative prescribing approach for obese patients with comorbidities is to take a weight-centric approach to overall disease management. In other words, whenever possible, the physician should select medications that treat the comorbid condition and that also lead to weight loss or are at least weight-neutral. For example, metformin may be an appropriate choice for obese patients with type 2 diabetes because it is not associated with weight gain (as opposed to insulin, for example) and may result in weight loss in some patients.<sup>18,59</sup>

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## Bariatric Surgery

Multiple studies have demonstrated that bariatric surgery produces substantial and sustained weight loss, and results in amelioration of obesity-related comorbidities, compared with usual care. Bariatric surgery also appears to improve long-term survival. Perhaps just as important, bariatric surgery has the potential to dramatically improve a patient's quality of life.<sup>72-80</sup>

Bariatric surgery may be considered in adults who have not achieved weight loss with dietary or other treatments and who have a BMI of 40 kg/m<sup>2</sup> or greater, or for those who have a BMI of 35 kg/m<sup>2</sup> or greater with significant obesity-related comorbidities (e.g., severe hypertension, type 2 diabetes, obstructive sleep apnea).<sup>75</sup> Bariatric surgery may also benefit patients with obesity-related comorbidities who have a BMI of 35 kg/m<sup>2</sup> or lower, but it is not routinely recommended for these patients.<sup>72,75</sup>

Numerous bariatric procedures are in use and are generally categorized as either restrictive or primarily malabsorptive. Restrictive procedures limit the size of the stomach. Examples include laparoscopic adjustable gastric banding and vertical sleeve gastrectomy. Malabsorptive procedures restrict the size of the stomach to some extent but also involve bypassing a portion of the small intestine. Roux-en-Y gastric bypass is an example of this type of procedure.<sup>32,76</sup> A Cochrane review comparing bariatric procedures found all to be more effective in promoting weight loss than nonsurgical methods. Roux-en-Y gastric bypass and vertical sleeve gastrectomy were more effective than laparoscopic adjustable gastric banding.<sup>81</sup>



Bariatric surgery has generated much excitement as a possible way to reverse disease in obese patients with type 2 diabetes. Studies comparing bariatric surgery with pharmacotherapy in obese patients with diabetes have reported disease remission in the majority of patients who undergo surgery.<sup>72,79,82</sup> Although these results are promising, additional research is needed before bariatric surgery can be added to the list of treatment options for type 2 diabetes.

Significant improvements have been made in the safety of bariatric procedures, but no surgery is without risk. Patients must understand that perioperative complications, including the risk of death, are possible.<sup>72,83</sup> In addition, it is essential to emphasize that bariatric surgery is not a magic bullet. Following surgery, a significant number of patients fail to achieve optimal weight loss and/or regain weight. Some studies suggest that these results occur, at least in part, because patients return to or develop problematic dietary patterns.<sup>84,85</sup>

Sustained changes in diet and exercise habits are essential following bariatric surgery. Obesity must be viewed as a chronic disease. Thus, the factors that contribute to obesity, such as poor diet and inactivity, must be continually addressed. When family physicians follow up with patients after bariatric surgery, they have the opportunity to reinforce the message that continuing adherence to healthy lifestyle habits is critical to long-term weight management.<sup>85</sup>

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## Overweight and Obesity in Children

Since the 1980s, obesity in children and adolescents has increased threefold. Approximately 17% of children and adolescents ages 2 to 19 years are obese (BMI at or above the 95th percentile for age and sex).<sup>12,86</sup> Childhood obesity causes health problems, such as elevated cholesterol and blood pressure levels, as well as social-psychologic difficulties for children. It also predisposes children to obesity and significant morbidity in adulthood.<sup>87,88</sup>

The USPSTF and the American Academy of Family Physicians (AAFP) recommend that physicians screen children ages 6 years or older for obesity and offer comprehensive, intensive behavioral interventions to promote improvement in weight status.<sup>86</sup> The American Academy of Pediatrics (AAP) recommends that BMI be calculated and plotted annually in children to aid early recognition of inappropriate weight gain.<sup>89</sup>

Discussions about good nutrition and regular physical activity can and should take place at all ages and stages of life. An abundance of patient information is available online about healthy eating habits. For example, ChooseMyPlate.gov offers tips for parents on how to be role models for their children.<sup>40</sup>

The benefits of physical activity in preventing childhood obesity should also be emphasized. The 2008 Physical Activity Guidelines for Americans recommends that children engage in moderate or vigorous aerobic activities for at least 60 minutes per day. Examples of moderate-intensity activities include skateboarding and bicycling, while vigorous-intensity activities include jumping rope, running, and sports such as soccer, basketball, and hockey.<sup>53</sup>

To support physicians in providing this type of counseling to families, the AAP has

developed the Healthy Active Living for Families (HALF) program, which identifies ways families with young children can be physically active and health focused.<sup>90</sup> The AAP also recommends that parents be counseled to limit screen time (i.e., time spent watching television or using other electronic media) to a maximum of 2 hours per day for children age 2 years or older.<sup>89</sup> In younger children, media use of any kind should be discouraged.<sup>91</sup>

The AAFP is also focused on the issue of childhood obesity and is actively addressing the problem through a variety of programs and activities. As a partner in the [Let's Move!](#) campaign, the AAFP is expanding and enhancing the following efforts:<sup>92</sup>

- [Americans in Motion Healthy Interventions \(AIM-HI\)](#) is a program that helps family physicians and their practice staff work with families to prevent and treat obesity and overweight by implementing a multifaceted fitness program based on physical activity, nutrition, and emotional well-being.
- [Ready, Set, FIT!](#) is a school-based educational program through AIM-HI and Scholastic (a publisher and distributor of children's books) that teaches third- and fourth-grade students about the importance of fitness. The program uses in-class lessons and take-home activities that encourage students to be active, eat smart, and feel good.
- [FamilyDoctor.org](#) contains a collection of patient-education materials to help physicians educate parents and children about nutrition, physical activity, and weight control.



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## Conclusion

The greatest promise for improving the nation's health lies in the encouragement of health-promoting behaviors such as physical activity and healthy eating that are ultimately necessary to prevent development of cardiovascular risk factors.<sup>93-95</sup>

Family physicians have a critical role to play in promoting positive health behaviors and turning the tide on the obesity epidemic. Patients look to their family physicians for guidance and support, and family physicians are often recognized as leaders in their communities. Family physicians should become involved, to whatever degree possible, in creating an environment in which healthy behaviors are encouraged and supported.

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## Resources

[2008 Physical Activity Guidelines for Americans](#)

[AIM-HI](#)

[Bariatric surgery animations](#)

[BMI calculator](#)

[BMI charts for adults](#)

[BMI charts for children](#)

[Choose My Plate](#)

[Choose My Plate – Be a Healthy Role Model](#)

[Counseling techniques](#)

[Exercise is Medicine](#)

[Healthy Active Living for Families](#)

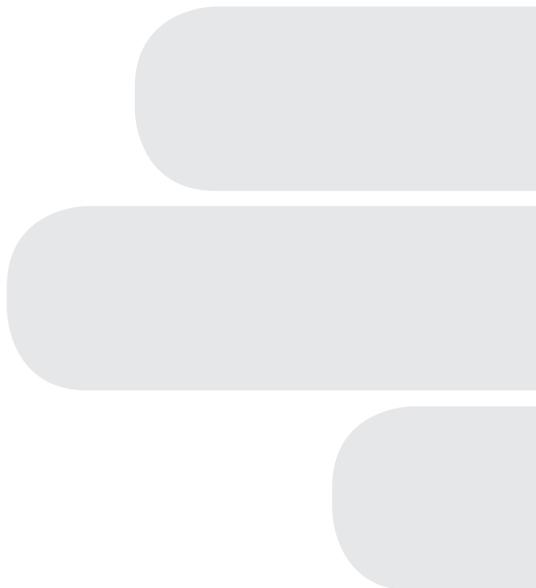
[Let's Move!](#)

[Nutrient Deficiency Questionnaire](#)

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