

Written by the doctors and editors at UpToDate

What does it mean to be obese? — Doctors use a special measure called "body mass index," or BMI, to decide who is underweight, at a healthy weight, overweight, or obese. A person who is obese weighs way too much for his or her height.

Your BMI will tell you whether your weight is appropriate for your height ([figure 1](#)).

- If your BMI is between 25 and 29.9, you are overweight.
- If your BMI is 30 or greater, you are obese.

Being obese is a problem, because it increases the risks of many different health problems. It can also make it hard for you to move, breathe, and do other things that people who are at a healthy weight can do easily. Plus, being obese can be hard emotionally, because it can make you feel ashamed or like you don't fit in.

What are the health risks of being obese? — Being obese increases a person's risk of developing many health problems. Here are just a few examples:

- Diabetes
- High blood pressure
- High cholesterol
- Heart disease (including heart attacks)
- Stroke
- Sleep apnea (a disorder in which you stop breathing for short periods while asleep)
- Asthma
- Cancer

Does being obese shorten a person's life? — Yes. Studies show that people who are obese die younger than people who are a healthy weight. They also show that the risk of death goes up the heavier a person is. The degree of increased risk depends on how long the person has been obese, and on what other medical problems he or she has.

People with "central obesity" might also be at risk of dying younger. Central obesity means carrying extra weight in the belly area, even if the BMI is normal.

Should I see a doctor or nurse? — Yes. If you are overweight or obese, see your doctor or nurse. He or she might have suggestions on ways to lose weight.

Are there medical treatments that can help me lose weight? — Yes. There are medicines and surgery to help with weight loss. But those treatments are only for people with severe obesity who have not been able to lose weight through diet and exercise. Also, weight loss treatments do not take the place of diet and exercise. People who have those treatments must also change how they eat and how active they are.

What can I do to prevent the problems caused by being obese? — The obvious answer is that you can lose weight. But even if weight loss is not possible, you can improve your health and reduce your risk if you:

- **Become more active** – Many types of physical activity can help, including walking. You can start with a few minutes a day and add more as you get stronger.

- **Improve your diet** – No single diet turns out to be better than any other. It is healthy to have regular meal times and smaller portions, and not to skip meals. Avoid sweets and processed snack foods, and instead eat more vegetables and fruits.
- **Quit smoking** (if you smoke)
- **Limit alcohol** – Drink no more than 1 drink a day if you are woman, and no more than 2 drinks a day if you are a man.

What increases a person's risk of being obese? — The thing that increases a person's risk the most is having an unhealthy lifestyle. Most people become obese because they simply eat too much and move too little. That's especially true of people who watch too much TV. But there are also a number of other factors that seem to increase the risk of obesity that many people do not know about. Here are some things that might affect a person's chance of becoming obese:

- **Mom's habits during pregnancy** – Women who eat a lot of calories, have diabetes, or smoke during pregnancy have a higher chance of having babies who grow up to be obese.
- **Formula feeding** – Babies who are fed formula are more likely than babies who are breastfed to grow up to be obese.
- **Habits and weight gain during childhood** – People who are overweight or obese as children or as teens are more likely to be obese as adults.
- **Sleeping too little** – People who do not get enough sleep are more likely to become obese than people who sleep enough.
- **Taking certain medicines** – Long-term use of certain medicines, such as some medicines to treat depression, can cause a lot of weight gain.

There are also hormonal conditions that can increase the risk of becoming obese, but those conditions are to blame for only a tiny fraction of cases of obesity.

What if I want to have children? — If you want to have children, you should know that being obese can make it hard for a woman to get pregnant. It can also impair a man's ability to have sex, especially if the obese man has high blood pressure or diabetes. What's more, children born to obese parents have a high risk of being obese themselves.

What if my child is obese? — In children, obesity has many of the same risks as it does in adults. For example, it can increase the risk of diabetes, high blood pressure, asthma, and sleep apnea. It can also cause added problems related to childhood. For example, obesity can make children grow faster than normal and speed up sexual development in girls.

More on this topic

[Patient education: Weight loss treatments \(The Basics\)](#)

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[Patient education: Preventing type 2 diabetes \(The Basics\)](#)

[Patient education: Type 2 diabetes \(The Basics\)](#)

[Patient education: My child is overweight \(The Basics\)](#)

[Patient education: Weight loss treatments \(Beyond the Basics\)](#)

[Patient education: Weight loss surgery and procedures \(Beyond the Basics\)](#)

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How do I know if I am overweight and by how much? — Doctors use a special measure called "body mass index," or BMI, to decide who is underweight, normal weight, or overweight. Your BMI will tell you whether your weight is appropriate for your height ([figure 1](#)).

- If your BMI is between 25 and 29.9, you are overweight.
- If your BMI is 30 or greater, you are obese.

Should I see a doctor or nurse? — If you are overweight or obese, see your doctor or nurse. He or she might have suggestions on ways to lose weight.

Obese people are more likely than people of normal weight to get diabetes, heart disease, cancer, and lots of other health problems. People who are obese also live less time than people of normal weight. That's why it's important to try to keep your weight in the normal range.

What's the best way to lose weight on my own? — To lose weight, you have to eat less or move more. Doing both is even better.

Studies have compared different diets such as the Atkins diet, the Zone diet, and the Weight Watchers diet. No single diet turns out to be better than any other. Any diet that reduces the number of calories you eat can help you lose weight – as long as you stick with it.

Physical activity works the same way. You can walk, dance, garden, or even just move your arms while sitting. What's important is that you increase the number of calories you burn by moving more. And you have to keep doing the extra activity.

If you go on a diet for a short time, or increase your activity for a while, you might lose weight. But you will regain the weight if you go back to your old habits. Weight loss is about changing your habits for good.

The best way to start is to make small changes and stick with them. Then, little by little, you can add new changes that you also stick with.

Are there medical treatments that can help me lose weight? — There are medicines and surgery to help with weight loss. But those treatments are only for people with extreme weight problems who have not been able to lose weight through diet and exercise. What's more, weight loss treatments do not take the place of diet and exercise. People who have those treatments must also change how they eat and how active they are.

How do weight loss medicines work? — Weight loss medicines work by reducing your appetite or by changing the way you digest food. They are appropriate only for people who:

- Have a BMI of 30 or greater; or
- Have a BMI between 27 and 29.9 and also have medical problems, such as diabetes, heart disease, or high blood pressure

Can I try herbal or non-prescription medicines to lose weight? — Some herbal weight loss medicines are unsafe. Check with your doctor or pharmacist before you take any herbal weight loss medicines. There is also a non-prescription version of a medicine doctors prescribe. This medicine is called [orlistat](#) (brand name: Alli). It is probably safe to try. But it can cause unwanted side effects, such as cramps, burping, and gas.

Some weight loss medicines are sold over the internet. However, these are not always safe, and they can even contain harmful ingredients.

How do weight loss procedures work? — Weight loss procedures work by making your stomach smaller. Some types of surgery also change the path food takes through your gut so that fewer calories and nutrients get absorbed. Another procedure changes the nerve signals between the brain and the stomach so you don't feel hungry.

Weight loss surgery is appropriate only for people who:

- Have a BMI greater than 40; or
- Have a BMI of 35 to 39.9 and also have medical problems, such as diabetes, heart disease, or high blood pressure

How do I decide if weight loss treatment is right for me? — If your doctor suggests weight loss treatment, ask these questions:

- **About how much weight can I expect to lose and how long will that take?** This depends on the treatment. There are several different types of stomach surgeries to help with weight loss. The amount of weight loss and how long it takes to lose weight is different for each one.
- **What are the risks of treatment for someone like me?** Medicines can have side effects. Surgery can lead to infections, bleeding, the need for other operations, and even death. To reduce the risk of these problems, make sure your surgeon is very experienced and that you are treated at a certified "Center of Excellence."
- **What changes will I need to make to my diet and lifestyle?** Weight loss treatments are not "short-cuts" that get you out of making lifestyle changes. People getting treated must also change how they eat and how active they are. No weight loss treatment works on its own. Sometimes people can get surgery only after they prove they can make lifestyle changes – by losing some weight on their own.
- **Will I be able to process food normally?** Some types of stomach surgeries leave people unable to get all the nutrients they need from food. People who have this problem must take vitamin and mineral supplements for the rest of their lives.

More on this topic

[Patient education: My child is overweight \(The Basics\)](#)

[Patient education: Health risks of obesity \(The Basics\)](#)

[Patient education: Weight loss surgery \(The Basics\)](#)

[Patient education: Weight loss treatments \(Beyond the Basics\)](#)

[Patient education: Weight loss surgery and procedures \(Beyond the Basics\)](#)

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INTRODUCTION — The morbidity and mortality associated with being overweight or obese have been known to the medical profession since the time of Hippocrates more than 2500 years ago. Overweight refers to a weight above the "normal" range, with normal defined on the basis of actuarial data. This is determined by calculating the body mass index (BMI, defined as the weight in kilograms divided by height in meters squared). Overweight is defined as a BMI of 25 to 29.9 kg/m²; obesity is defined as a BMI of ≥30 kg/m². Severe obesity is defined as a BMI ≥40 kg/m² (or ≥35 kg/m² in the presence of comorbidities). Although these categorical definitions are clinically useful, it is clear that the risks imparted by increasing body mass follow a continuum.

An overview of the management of obesity is provided here. Information on screening, evaluation, health hazards associated with obesity, and specific therapies are reviewed in detail elsewhere.

- (See "[Obesity in adults: Prevalence, screening, and evaluation](#)".)
- (See "[Obesity in adults: Health hazards](#)".)
- (See "[Obesity in adults: Dietary therapy](#)".)
- (See "[Obesity in adults: Role of physical activity and exercise](#)".)
- (See "[Obesity in adults: Behavioral therapy](#)".)
- (See "[Obesity in adults: Drug therapy](#)".)
- (See "[Bariatric procedures for the management of severe obesity: Descriptions](#)".)

IMPORTANCE OF WEIGHT LOSS — The medical rationale for weight loss in obese subjects is that obesity is associated with a significant increase in mortality ([figure 1](#)) and many health risks, including type 2 diabetes mellitus, hypertension, dyslipidemia, and coronary heart disease. The higher the body mass index (BMI), the greater the risk of morbidity and mortality [1]. The relationship between BMI and mortality is likely to be similar for all races and ethnicities, but the minimal BMI where excess risk is seen may differ. These risks are reviewed in detail separately. (See "[Obesity in adults: Health hazards](#)".)

Morbidity — Life insurance reports were the first to suggest that lower body weight was associated with lower morbidity and mortality. In subsequent randomized trials, weight loss (via lifestyle or pharmacologic therapy) has been shown to reduce morbidity (reduction in risk factors for cardiovascular disease [CVD]) [1].

The frequently cited Diabetes Prevention Program (DPP) significantly reduced the rate of progression from impaired glucose tolerance to diabetes over a three-year period in participants randomized to intensive lifestyle modification focusing on weight loss [2]. The efficacy of intensive lifestyle modification for diabetes prevention continued over 15 years but was somewhat attenuated over time. There was also a persistent reduction in risk factors for CVD [3,4].

Other trials have also reported a beneficial effect of weight loss on risk factors for CVD, including blood pressure [5,6] and plasma lipid levels [7] (see "[Obesity, weight reduction, and cardiovascular disease](#)", section on '[Benefits of weight loss](#)'). Additional benefits of weight loss include reductions in urinary incontinence, sleep apnea, and depression, as well as improvements in quality of life, physical functioning, and mobility.

Mortality — Although there are no randomized trials that show a reduction in mortality with weight loss, there is evidence from observational and other studies that weight loss in overweight and obese adults is associated with a reduction in mortality [6,8]. Bariatric surgery has also been associated with a decrease in mortality [9-11]. (See "[Medical outcomes following bariatric surgery](#)".)

In the Look AHEAD (Action for Health in Diabetes) trial, 5145 individuals with type 2 diabetes and BMI >25 kg/m² were randomly assigned to an intensive lifestyle intervention (group and individual meetings to achieve weight loss with diet and exercise) or standard diabetes education [12]. After a median follow-up of 9.6 years, the composite primary outcome (death from cardiovascular causes, nonfatal myocardial infarction, nonfatal stroke, and hospitalization for angina) occurred in a similar number of patients in the intervention and control groups [13]. Possible reasons for this finding include the lower-than-expected rates of cardiovascular events in both groups, improved overall cardiovascular risk factor treatment with medical therapy (eg, antihypertensives, statins), enrollment of a relatively healthy patient population, and gradual weight loss in the control group such that the differential weight loss between the two groups was only 2.5 percent at study end [14]. Of note, the active intervention group achieved its results with significantly less use of CVD risk-lowering medications than the control group.

APPROACH TO THERAPY — The approach to management outlined below is based upon the available clinical trial evidence (reviewed in the individual topics) and clinical expertise and is largely in agreement with published guidelines ([algorithm 1](#)). (See '[Clinical guidelines](#)' below.)

The goal of therapy is to prevent, reverse, or ameliorate the complications of obesity and improve quality of life [15,16]. Thus, the selection of patients for treatment is based upon initial risk assessment.

More than two-thirds of adults in the United States are either trying to lose weight or maintain their weight at any given time [17]. However, only 20 percent are both eating fewer calories and engaging in at least 150 minutes of physical activity during leisure time each week. Thus, clinicians can play an important role in educating people regarding the need for and the optimal strategies for losing weight.

Goals of treatment — The goal of therapy is to prevent, treat, or reverse the complications of obesity. Studies have reported health benefits with weight loss of only 5 percent of body weight [2]. Many patients, however, have a weight loss goal of 30 percent or more below their current weight, a goal that is often not achievable. With lifestyle measures only, an initial weight loss goal of 5 to 7 percent of body weight is more typical. In trials comparing pharmacologic therapy with placebo, weight loss of 10 to 15 percent using both drug and behavioral intervention is considered a very good response, and weight loss exceeding 15 percent is considered an excellent response. Thus, realistic and achievable weight loss goals should be individualized and agreed upon by patient and physician.

Identify candidates — Assessment of an individual's overall risk status includes determining the degree of overweight (body mass index [BMI]), the presence of abdominal obesity (waist circumference), and the presence of cardiovascular risk factors (eg, hypertension, diabetes, dyslipidemia) or comorbidities (eg, sleep apnea, nonalcoholic fatty liver disease). The relationship between BMI and risk allows identification of patients to target for weight loss intervention ([algorithm 1](#)). (See "[Obesity in adults: Prevalence, screening, and evaluation](#)", section on '[Assessing obesity-related health risk](#)'.)

- **Little or no risk** – A BMI of 20 to 25 kg/m² is associated with little or no increased risk unless waist circumference is high (a marker of increased cardiometabolic risk), or the subject has gained more than 10 kg since age 18 years. Asians and Asian Americans start to incur risk, even in this low range. (See "[Obesity in adults: Prevalence, screening, and evaluation](#)", section on '[BMI-based classifications](#)'.)

- **Low risk** – Individuals with a BMI of 25 to 29.9 kg/m², who do not have risk factors for cardiovascular disease (CVD) or other obesity-related comorbidities, may be described as having low risk. They should receive counseling on prevention of weight gain. This includes advice on dietary habits and physical activity.
- **Moderate risk** – Individuals with a BMI between 25 and 29.9 kg/m² and with one or more risk factors for CVD (diabetes, hypertension, dyslipidemia), or with a BMI of 30 to 34.9 kg/m², are at moderate risk. They should be counseled about weight loss interventions (diet, physical activity, behavioral modification, and for some patients, pharmacologic therapy).
- **High risk** – Individuals with a BMI of 35 to 40 kg/m² are at high risk, and those with a BMI above 40 kg/m² are at very high risk from their obesity. Individuals in the highest risk categories should receive the most aggressive treatment (lifestyle intervention, pharmacologic therapy, bariatric surgery).

The second Diabetes Surgery Summit (DSS-II) has made recommendations for bariatric surgery for obese patients with type 2 diabetes based upon BMI categories and glycemic control [18].

BMI is calculated as follows:

BMI = body weight (in kg) ÷ height squared, in meters

The BMI can be estimated from a table or a calculator ([table 1A-B](#)) ([calculator 1](#)). BMI is correlated with body fat. Overweight and obesity are defined as a BMI between 25 and 29.9 kg/m² and a BMI ≥30 kg/m², respectively. As noted, an elevated BMI is a necessary but not sufficient basis for treatment. (See "[Obesity in adults: Prevalence, screening, and evaluation](#)", section on 'Body mass index'.)

Waist circumference is measured with a metal or plastic, nondistensible tape measure, placed around the abdomen parallel to the floor at the level of the iliac crest with the patient standing ([figure 2](#)). A waist circumference of ≥40 inches (102 cm) for men and ≥35 inches (88 cm) for women is considered elevated and indicative of increased cardiometabolic risk [1]. In the BMI range of 25 to 35 kg/m², an increased waist circumference may indicate need for more aggressive treatment [1]. (See "[Obesity in adults: Prevalence, screening, and evaluation](#)", section on 'Waist circumference'.)

There is ethnic variability in waist circumference values that predict increased risk. As an example, Japanese Americans and Indians from South Asia have more total fat and visceral fat and therefore may be at higher risk of developing type 2 diabetes for a given BMI than whites. In Asian females, waist circumference >80 cm (31.5 inches) and in Asian males a value >90 cm (35.4 inches) are considered abnormal. (See "[Obesity in adults: Prevalence, screening, and evaluation](#)", section on 'Waist circumference'.)

Initial treatment — The initial management of individuals who would benefit from weight loss is a comprehensive lifestyle intervention: a combination of diet, exercise, and behavioral modification. All patients who would benefit from weight loss should receive counseling on diet, exercise, and goals for weight loss. The role of behavioral therapy, diet, and exercise for obesity are all reviewed in detail separately (see "[Obesity in adults: Behavioral therapy](#)" and "[Obesity in adults: Dietary therapy](#)", section on 'Goals of weight loss' and "[Obesity in adults: Role of physical activity and exercise](#)"). The behavioral component facilitates adherence to diet and exercise regimens. It includes regular self-monitoring of food intake, physical activity, and body weight.

Comprehensive lifestyle intervention — One example of a successful comprehensive lifestyle intervention program is the Diabetes Prevention Program (DPP) [2], subsequently used in the Look AHEAD study [13]. The two major goals of the DPP lifestyle intervention were a minimum of 7 percent weight loss and a minimum of 150 minutes of exercise per week (such as brisk walking). Several behavioral components were used to help achieve these goals, including behavioral self-management training, individual case managers, group and/or individual sessions, individualized adherence strategies, and a network of training, feedback, and clinical support

[19]. Using this approach, the DPP reported that lifestyle intervention was more effective for preventing diabetes than a pharmacologic intervention (metformin) [2]. (See "Prevention of type 2 diabetes mellitus" and "Obesity in adults: Role of physical activity and exercise" and "Obesity in adults: Dietary therapy".)

Although a number of commercially available weight loss programs boast >10 percent weight loss, a meta-analysis of 22 behavioral weight loss studies showed just over 4 percent average loss compared with 1 percent for the control groups, with maximal effect within the first six months after the initiation of treatment [2,20,21]. Regrettably, as with other therapies for obesity, maintenance of these initial weight losses has been difficult [22]. One exception is bariatric surgery, which results in 15 to 30 percent total weight loss that can be sustained for years [23-26].

Dietary therapy — Many types of diets produce modest weight loss. Options include balanced low-calorie, low-fat low-calorie, moderate-fat low-calorie, low-carbohydrate diets, and the Mediterranean diet. Dietary adherence is an important predictor of weight loss, regardless of the type of diet [27]. Thus, we suggest tailoring a diet that reduces energy intake below energy expenditure to individual patient preferences, rather than focusing on the macronutrient composition of the diet. The addition of dietary counseling may facilitate weight loss, particularly during the first year. (See "Obesity in adults: Dietary therapy", section on 'Types of diets'.)

Metabolic studies using state-of-the-art techniques have shown all adults will lose weight when fed <1000 kcal/day. Thus, even subjects who are concerned that they are "metabolically resistant" to weight loss will lose weight if they comply with a diet of 800 to 1200 kcal/day. More severe caloric restriction might be expected to induce weight loss more quickly, but a comparison with 400 versus 800 kcal/day diet formulas showed no difference in weight loss, presumably due to slowing of resting metabolic rate. We thus recommend diets with >800 kcal/day. (See "Obesity in adults: Dietary therapy", section on 'Very-low-calorie diets'.)

Continued surveillance by both physician and patient are essential for treatment success. Return visits with the physician, dietician, or behaviorist should be scheduled at regular intervals to assess barriers, discuss next steps, and offer encouragement. If weight loss is less than 5 percent in the first six months, something else should be tried. (See "Obesity in adults: Behavioral therapy" and "Obesity in adults: Dietary therapy".)

Exercise — Although less potent than dietary restriction in promoting weight loss, increasing energy expenditure through physical activity is a strong predictor of weight loss maintenance. Physical activity should be performed for approximately 30 minutes or more, five to seven days a week, to prevent weight gain and to improve cardiovascular health. There appears to be a dose effect for physical activity and weight loss, and much greater amounts of exercise are necessary to produce significant weight loss in the absence of a calorically-restricted diet. Therefore, when weight loss is the desired goal, a diet should be combined with physical activity and the activity should be gradually increased over time as tolerated by the patient. A multicomponent program that includes aerobic and resistance training is preferred. Existing medical conditions, age, and preferences for types of exercise should all be considered in the decisions. (See "Obesity in adults: Role of physical activity and exercise".)

Behavior modification — Behavior modification or behavior therapy is one cornerstone in the treatment for obesity. The goal of behavioral therapy is to help patients make long-term changes in their eating behavior by modifying and monitoring their food intake, modifying their physical activity, and controlling cues and stimuli in the environment that trigger eating. These concepts are usually included in programs conducted by psychologists or other trained personnel as well as many self-help groups. (See "Obesity in adults: Behavioral therapy".)

Subsequent treatment — For patients who are unable to achieve weight loss goals with a comprehensive lifestyle intervention alone, we suggest pharmacologic therapy or, in some cases, bariatric surgery.

- For individuals with a BMI ≥ 30 kg/m² or a BMI of 27 to 29.9 kg/m² with comorbidities, who have not met weight loss goals with diet and exercise alone, we suggest adding **pharmacologic therapy** to lifestyle intervention. (See "[Obesity in adults: Drug therapy](#)".)
- For patients with BMI ≥ 40 kg/m² who have not met weight loss goals with diet, exercise, and drug therapy, we suggest **bariatric surgery** [18]. Individuals with BMI > 35 kg/m² with obesity-related comorbidities who have not met weight loss goals with diet, exercise, and drug therapy are also potential surgical candidates, if the anticipated benefits outweigh the costs, risks, and side effects of the procedure. (See "[Bariatric operations for management of obesity: Indications and preoperative preparation](#)".)

Drug therapy — Drug therapy may be a helpful component of the treatment regimen for obese subjects; it can be considered for those with a BMI greater than 30 kg/m², or a BMI of 27 to 29.9 kg/m² if they have comorbid conditions. The role of drug therapy has been questioned because of concerns about efficacy, the potential for abuse, side effects, and cost. This topic is reviewed in detail elsewhere. (See "[Obesity in adults: Drug therapy](#)".)

Surgery — For patients with BMI ≥ 40 kg/m² who have not met weight loss goals with diet, exercise, and drug therapy, we suggest bariatric surgery [18]. We also consider bariatric surgery for individuals with BMI > 35 kg/m² with obesity-related comorbidities (who have not met weight loss goals) if the anticipated benefits outweigh the costs, risks, and side effects of the procedure [28]. (See "[Bariatric operations for management of obesity: Indications and preoperative preparation](#)".)

Several surgical approaches (collectively referred to as "bariatric surgery") have been used to treat severe obesity. All procedures, including investigational ones, are reviewed separately. (See "[Bariatric procedures for the management of severe obesity: Descriptions](#)".)

The Swedish Obese Subjects (SOS), a prospective controlled intervention study, provides the longest follow-up thus far of obese patients who chose either gastric banding, vertical banded gastroplasty, gastric bypass, or conventional treatment for weight loss [8]. After 10 to 20 years of follow-up, there were reductions in obesity-related morbidity (decreased incident rates of diabetes, hypertension, dyslipidemia) and overall mortality (hazard ratio [HR] 0.71, 95% CI 0.54-0.92) in the bariatric surgery group compared with the conventionally treated group. (See "[Medical outcomes following bariatric surgery](#)".)

In systematic reviews and meta-analyses of randomized trials comparing bariatric surgery to nonsurgical treatment of obesity (diet, exercise, weight-reducing drugs, behavioral therapy), there was greater weight loss and higher remission rates of type 2 diabetes in the bariatric surgery group [24,29]. The surgical management of obesity is reviewed in detail separately. (See "[Bariatric operations for management of obesity: Indications and preoperative preparation](#)" and "[Management of persistent hyperglycemia in type 2 diabetes mellitus](#)", section on 'Surgical treatment of obesity' and "[Medical outcomes following bariatric surgery](#)".)

Liposuction — We do not suggest liposuction as a strategy for long-term weight loss. Removal of fat by aspiration after injection of physiologic saline has been used to remove and contour subcutaneous fat. While this can result in a significant reduction in fat mass and weight, it does not appear to improve insulin sensitivity or risk factors for coronary heart disease. This was illustrated in a study of 15 obese women (eight with normal glucose tolerance and seven with type 2 diabetes) who underwent metabolic evaluation before and 10 to 12 weeks after large-volume abdominal liposuction with the following results [30]:

- Liposuction decreased the volume of subcutaneous abdominal adipose tissue by 44 percent (9 kg) in the women with normal glucose tolerance and by 28 percent (10.5 kg) in those with diabetes.
- Although waist circumference and plasma leptin concentrations were significantly decreased, no improvements in insulin sensitivity of muscle, liver, or adipose tissue were seen in either group.

- Liposuction did not alter plasma concentrations of C-reactive protein, interleukin-6, tumor necrosis factor- α , or adiponectin, and there were no significant improvements in other risk factors for coronary heart disease, including blood pressure, plasma glucose, lipid, or insulin concentrations. (See "[Overview of the risk equivalents and established risk factors for cardiovascular disease](#)".)

Thus, removal of large volumes of subcutaneous abdominal adipose tissue with liposuction does not improve insulin sensitivity or risk factors for coronary heart disease in obese women with or without type 2 diabetes, suggesting that the negative energy balance induced by decreased nutritional intake and/or removal of visceral fat are necessary for achieving the metabolic benefits of weight loss. (See "[Obesity in adults: Dietary therapy](#)".)

Complementary and alternative therapies

Dietary supplements — Although over-the-counter dietary supplements are widely used by individuals attempting to lose weight, we suggest against their use because evidence to support their efficacy and safety are limited. Examples of dietary supplements include ephedra, green tea, chromium, chitosan, and guar gum. Ephedra and ephedra alkaloids (Ma Huang), a group of ephedrine-like molecules found in plants, have been removed from the market because of safety concerns. (See "[Obesity in adults: Drug therapy](#)", section on '[Dietary supplements](#)'.)

Acupuncture — Acupuncture has also been studied for the treatment of obesity. While most studies have been uncontrolled trials, results from some, but not all, controlled trials have shown modest benefit of acupuncture for weight loss [31,32]. However, the majority of these controlled trials are small, of short duration, and do not include adequate placebo controls.

Risks of treatment — Treatments for obesity can be divided according to the risk of side effects. Most of the currently available drugs have minor side effects that diminish with treatment; however, a few serious side effects have been identified that should preclude short-term use in subjects who wish to lose small amounts of weight (the majority of overweight people). Even with potentially dangerous drugs, chronic treatment may be needed when the magnitude of the obesity carries larger risks, eg, a BMI above 30 kg/m², or between 27 and 30 kg/m² with complicating factors such as diabetes mellitus or hypertension. (See "[Obesity in adults: Drug therapy](#)".)

Significant weight loss achieved via any modality may increase the likelihood of cholelithiasis because the flux of cholesterol through the biliary system increases. Diets with moderate amounts of fat that trigger gallbladder contraction may reduce this risk. Similarly, therapy with a bile acid (eg, [ursodeoxycholic acid](#)) may be advisable in selected subjects, such as those who are losing weight rapidly (>1 to 1.5 kg/week).

Maintenance of weight loss — Achieving and maintaining weight loss is made difficult by the reduction in energy expenditure that is induced by weight loss [33,34]. In one study, as an example, maintenance of body weight at 10 percent below the baseline weight in obese subjects was associated with an 8 kcal/kg decrease in energy expenditure [33].

Recidivism, which is regaining of lost weight, is a common problem in treating obesity. Some reports suggest that subjects who lose weight during any treatment program may not maintain the weight loss [28]. A number of strategies to help maintain weight loss, including frequent self-weighing and other behavioral interventions, consumption of a reduced-calorie diet, and high levels of physical activity, are reviewed separately. (See "[Obesity in adults: Behavioral therapy](#)", section on '[Maintenance of weight loss](#)' and "[Obesity in adults: Dietary therapy](#)", section on '[Role of dietary counseling](#)' and "[Obesity in adults: Role of physical activity and exercise](#)", section on '[Maintenance of weight loss](#)'.)

Characteristics of those who are likely to succeed include frequent self-monitoring [35,36], a weight loss of more than 2 kg in four weeks, frequent and regular attendance at a weight loss program, and the subject's belief that

his or her weight can be controlled. Altogether, sustained weight loss requires sustained behavior change.

CLINICAL GUIDELINES — Several guidelines are available for the evaluation and treatment of obesity including:

- The American Heart Association (AHA)/American College of Cardiology (ACC)/The Obesity Society (TOS) Guidelines for the Management of Overweight and Obesity in Adults [1]
- The National Heart, Lung, and Blood Institute (NHLBI) and the North American Association for the Study of Obesity (NAASO) [28]
- National Institute for Health and Care Excellence (NICE) [37]
- The Endocrine Society [38]

The approach outlined above is largely in agreement with these guidelines.

INFORMATION FOR PATIENTS — UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "[Patient education: Weight loss treatments \(The Basics\)](#)")
- Beyond the Basics topics (see "[Patient education: Weight loss treatments \(Beyond the Basics\)](#)")

SUMMARY AND RECOMMENDATIONS

- The medical rationale for weight loss in obese individuals is that obesity is associated with a significant increase in mortality ([figure 1](#)) and many health risks including type 2 diabetes mellitus, hypertension, dyslipidemia, and coronary heart disease. The benefits of weight loss include a reduction in the rate of progression from impaired glucose tolerance to diabetes, blood pressure in hypertensive patients, and lipid levels in higher risk patients. Other noncardiac benefits of weight loss include reductions in urinary incontinence, sleep apnea, and depression, as well as improvements in quality of life, physical functioning, and mobility. (See '[Importance of weight loss](#)' above and "[Obesity in adults: Health hazards](#)".)
- Selection of treatment for overweight subjects is based upon an initial risk assessment ([algorithm 1](#)). (See '[Identify candidates](#)' above and "[Obesity in adults: Prevalence, screening, and evaluation](#)".)
- All patients who would benefit from weight loss should receive counseling on diet, exercise, and goals for weight management. (See '[Initial treatment](#)' above and "[Obesity in adults: Behavioral therapy](#)" and "[Obesity in adults: Role of physical activity and exercise](#)" and "[Obesity in adults: Dietary therapy](#)".)
- For individuals with a body mass index (BMI) >30 kg/m² or a BMI of 27 to 29.9 kg/m² with comorbidities, who have failed to achieve weight loss goals through diet and exercise alone, we suggest pharmacologic therapy be added to diet and exercise (**Grade 2B**). Detailed recommendations for pharmacotherapy are discussed separately. (See "[Obesity in adults: Drug therapy](#)", section on '[Our approach](#)'.)

- For patients with a BMI ≥ 40 kg/m² who have failed to lose weight with diet, exercise, and drug therapy, we suggest bariatric surgery (**Grade 2B**). Individuals with a BMI >35 kg/m² with obesity-related comorbidities (hypertension, impaired glucose tolerance, diabetes mellitus, dyslipidemia, sleep apnea) who have not met weight loss goals with diet, exercise, and drug therapy are also potential surgical candidates, assuming that the anticipated benefits outweigh the costs, risks, and side effects of the procedure. (See "[Bariatric operations for management of obesity: Indications and preoperative preparation](#)".)

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INTRODUCTION — Obesity is a major international public health problem and Americans are among the heaviest people in the world. The percentage of obese people in the United States rose steadily until 2003, after which time the percentage has remained unacceptably high [1].

Many people find that although they initially lose weight by dieting, they quickly regain the weight after the diet ends. Because it is so hard to keep weight off over time, it is important to have as much information and support as possible before starting a diet. You are most likely to be successful in losing weight and keeping it off when you believe that your body weight can be controlled.

This article discusses how to get started with a weight loss plan, including changes in your behavior, what you eat, and weight loss medications. Weight loss surgery is discussed in a separate article. (See "[Patient education: Weight loss surgery and procedures \(Beyond the Basics\)](#)".)

More detailed information about weight loss is available by subscription. (See "[Obesity in adults: Overview of management](#)".)

STARTING A WEIGHT LOSS PROGRAM — Some people like to talk to their health care professional to get help choosing the best plan, monitoring progress, and getting advice and support along the way.

To know what treatment (or combination of treatments) will work best, determine your body mass index (BMI) and waist circumference (measurement). The BMI is calculated from your height and weight ([calculator 1](#) and [calculator 2](#)).

- A person with a BMI between 25 and 29.9 is considered overweight
- A person with a BMI of 30 or greater is considered to be obese

A waist circumference greater than 35 inches (88 cm) in women and 40 inches (102 cm) in men increases the risk of obesity-related complications, such as heart disease and diabetes. People who are obese and who have a larger waist size may need more aggressive weight loss treatment than others. Talk to your health care professional for advice.

Types of treatment — Based on your measurements and your medical history, your doctor or nurse can determine what combination of weight loss treatments would work best for you. Treatments may include changes in lifestyle, exercise, dieting and, in some cases, weight loss medicines or weight loss surgery [2]. Weight loss surgery, also called bariatric surgery, is reserved for people with severe obesity who have not

responded to other weight loss treatments. (See "[Patient education: Weight loss surgery and procedures \(Beyond the Basics\)](#)".)

SETTING A WEIGHT LOSS GOAL — It is important to set a realistic weight loss goal. Your first goal should be to avoid gaining more weight and staying at your current weight (or within 5 percent or 5 pounds). Many people have a “dream” weight that is difficult or impossible to achieve.

People at high risk of developing diabetes who are able to lose 5 percent of their body weight and maintain this weight will reduce their risk of developing diabetes by about 50 percent and reduce their blood pressure. This is a success.

Losing more than 15 percent of your body weight and staying at this weight is an extremely good result, even if you never reach your “dream” or “ideal” weight.

LIFESTYLE CHANGES — Programs that help you to change your lifestyle are usually run by psychologists, nutritionists, or other professionals. The goals of lifestyle changes are to help you change your eating habits, become more active, and be more aware of how much you eat and exercise, helping you to make healthier choices.

This type of treatment can be broken down into three steps:

- The triggers that make you want to eat
- Eating
- What happens after you eat

Triggers to eat — Determining what triggers you to eat involves figuring out what foods you eat and where and when you eat them. To figure out what triggers you to eat, keep a record for a few days of everything you eat, the places where you eat, how often you eat, and the emotions you were feeling when you eat.

For some people, the trigger is related to a certain time of day or night. For others, the trigger is related to a certain place, like sitting at a desk working or driving past a favorite fast-food outlet.

Eating — You can change your eating habits by breaking the chain of events between the trigger for eating and eating itself. There are many ways to do this. For instance, you can:

- Limit where you eat to a few places (eg, dining room)
- Restrict the number of utensils (eg, only a fork) used for eating
- Drink a sip of water between each bite
- Chew your food a certain number of times
- Get up and stop eating every few minutes

The types of foods we eat on a regular basis are related to whether we gain or lose weight over time. Whole grains, fruits, vegetables, nuts, and yogurt are associated with lower weight over four years, as contrasted with weight gain seen when eating french fried potatoes or chips, sugar-sweetened beverages, and red or processed meats [3].

What happens after you eat — Rewarding yourself for good eating behaviors can help you to develop better habits. This is not a reward for weight loss; instead, it is a reward for changing unhealthy behaviors toward healthy ones.

Do not use food as a reward. Some people find money, clothing, or personal care (eg, a haircut, manicure, or massage) to be effective rewards. Treat yourself immediately after making better eating choices to reinforce the

value of the good behavior.

You need to have clear behavior goals and you must have a time frame for reaching your goals. Reward small changes along the way to your final goal.

Other factors that contribute to successful weight loss — Changing your behavior involves more than just changing unhealthy eating habits; it also involves finding people around you to support your weight loss, reducing stress, and learning to be strong when tempted by food.

- Establish a “buddy” system – Having a friend or family member available to provide support and reinforce good behavior is very helpful. The support person needs to understand your goals.
- Learn to be strong – Learning to be strong when tempted by food is an important part of losing weight. As an example, you will need to learn how to say “no” and continue to say no when urged to eat at parties and social gatherings. Develop strategies for events before you go, such as eating before you go or taking low-calorie snacks and calorie-free drinks with you.
- Develop a support system – Having a support system is helpful when losing weight. This is why many commercial groups are successful. Family support is also essential; if your family does not support your efforts to lose weight, this can slow your progress or even keep you from losing weight.
- Positive thinking – People often have conversations with themselves in their head; these conversations can be positive or negative. If you eat a piece of cake that was not planned, you may respond by thinking, “Oh, you stupid idiot, you’ve blown your diet!” and as a result, you may eat more cake.

A positive thought for the same event could be, “Well, I ate cake when it was not on my plan. Now I should do something to get back on track.” A positive approach is much more likely to be successful than a negative one.

- Reduce stress – Although stress is a part of everyday life, it can trigger uncontrolled eating in some people. It is important to find a way to get through these difficult times without eating or by eating low-calorie food, like raw vegetables. It may be helpful to imagine a relaxing place that allows you to temporarily escape from stress. With deep breaths and closed eyes, you can imagine this relaxing place for a few minutes.
- Self-help programs – Self-help programs like Weight Watchers, Overeaters Anonymous, and Take Off Pounds Sensibly (TOPS) work for some people. As with all weight loss programs, you are most likely to be successful with these plans if you make long-term changes in how you eat.

CHOOSING A DIET OR NEW EATING PLAN — A calorie is a unit of energy found in food. Your body needs calories to function. The goal of any diet is to burn up more calories than you eat. (See ["Obesity in adults: Dietary therapy"](#).)

How quickly you lose weight on a given calorie intake depends upon several factors, such as your age, gender, and starting weight.

- Older people have a slower metabolism than young people, so they lose weight more slowly.
- Men lose more weight than women of similar height and weight when dieting because they have more muscle mass, which uses more energy.
- People who are extremely overweight lose weight more quickly than those who are only mildly overweight.

How many calories do I need? — You can estimate the number of calories you need per day based upon your current (or target) weight, gender, and activity level for women and for men [4].

In general, it is best to choose foods that contain enough protein, carbohydrates, essential fatty acids, and vitamins. (See "[Patient education: Diet and health \(Beyond the Basics\)](#)".)

Try not to drink alcohol or sugar-sweetened beverages (sodas and fruit drinks) and avoid sweets (candy, cakes, cookies), since they rarely contain important nutrients [5].

Portion-controlled diets — One simple way to diet is to buy pre-packaged foods, like frozen low-calorie meals or meal-replacement canned drinks or bars. A typical meal plan for one day may include:

- A meal-replacement drink or breakfast bar for breakfast
- A meal-replacement drink or a frozen low-calorie (250 to 350 calories) meal for lunch
- A frozen low-calorie meal or other prepackaged, calorie-controlled meal, along with extra vegetables for dinner

This would give you 1000 to 1500 calories per day.

Low-fat diet — To reduce the amount of fat in your diet, you can:

- Eat low-fat foods. Low-fat foods are those that contain less than 30 percent of calories from fat. Fat is listed on the food facts label ([figure 1](#)).
- Count fat grams. For a 1500-calorie diet, this would mean about 45 g or fewer of fat per day.

Low-carbohydrate diet — Low and very-low-carbohydrate diets (eg, Atkins diet, South Beach diet) have become popular ways to lose weight quickly.

- With a very-low-carbohydrate diet, you eat between 0 and 60 grams of carbohydrates per day (a standard diet contains 200 to 300 grams of carbohydrates).
- With a low-carbohydrate diet, you eat between 60 and 130 grams of carbohydrates per day.

Carbohydrates are found in fruits, vegetables, grains (including breads, rice, pasta, and cereal), alcoholic beverages, and dairy products. Meat and fish contain very few carbohydrates.

Side effects of very-low-carbohydrate diets can include constipation, headache, bad breath, muscle cramps, diarrhea, and weakness.

Mediterranean diet — The term "Mediterranean diet" refers to a way of eating that is common in olive-growing regions around the Mediterranean Sea. Although there is some variation in Mediterranean diets, there are some similarities. Most Mediterranean diets include:

- A high level of monounsaturated fats (from olive or canola oil, walnuts, pecans, almonds) and a low level of saturated fats (from butter).
- A high amount of vegetables, fruits, legumes, and grains (7 to 10 servings of fruits and vegetables per day).
- A moderate amount of milk and dairy products, mostly in the form of cheese. Use low-fat dairy products (skim milk, fat-free yogurt, low-fat cheese).
- A relatively low amount of red meat and meat products. Substitute fish or poultry for red meat.

- For those who drink alcohol, a modest amount (mainly as red wine) may help to protect against cardiovascular disease. A modest amount is up to one (4 ounce) glass per day for women and up to two glasses per day for men.

Which diet is best? — Studies have compared different diets, including:

- Very low carbohydrate (Atkins)
- Macronutrient balance controlling glycemic load (Zone)
- Reduced calorie (Weight Watchers)
- Very low fat (Ornish)

No one diet is “best” for weight loss [2,6,7]. Any diet will help you to lose weight if you stick with the diet. Therefore, it is important to choose a diet that includes foods you like.

Fad diets — Fad diets often promise quick weight loss (more than 1 to 2 pounds per week) and may claim that you do not need to exercise or give up your favorite foods. Some fad diets cost a lot of money because you have to pay for seminars, pills, or packaged food. Fad diets generally lack any scientific evidence that they are safe and effective, but instead rely on “before” and “after” photos or testimonials.

Diets that sound too good to be true usually are. These plans are a waste of time and money and are not recommended. A doctor, nurse, or nutritionist can help you find a safe and effective way to lose weight and keep it off.

WEIGHT LOSS MEDICINES — Taking a weight loss medicine may be helpful when used in combination with diet, exercise, and lifestyle changes [8]. However, it is important to understand the risks and benefits of these medicines. It is also important to be realistic about your goal weight using a weight loss medicine; you may not reach your “dream” weight, but you may be able to reduce your risk of diabetes or heart disease. (See “[Obesity in adults: Drug therapy](#)”.)

Weight loss medicines may be recommended for people who have not been able to lose weight with diet and exercise who have a:

- Body mass index (BMI) of 30 or more ([calculator 1](#) and [calculator 2](#))
- BMI between 27 and 29.9 and have other medical problems, such as diabetes, high cholesterol, or high blood pressure, and who have failed to achieve weight loss goals through diet and exercise alone.

Orlistat — Orlistat (brand name: Xenical) is a medicine that reduces the amount of fat your body absorbs from the foods you eat. A lower-dose version (brand name: Alli) is available without a prescription in many countries, including the United States. The recommended dose of the prescription version is 1 capsule three times per day, taken with a meal; you can skip a dose if you skip a meal or if the meal contains no fat.

After one year of treatment with orlistat combined with lifestyle changes, the average weight loss is approximately 11.7 pounds (5.3 kg) or 8 to 10 percent of initial body weight (4 percent more than in those who used a placebo pill with lifestyle changes). Cholesterol levels often improve and blood pressure sometimes falls. In people with diabetes, orlistat may help control blood sugar levels.

Side effects occur in 10 to 15 percent of people and may include stomach cramps, gas, diarrhea, leakage of stool, or oily stools. These problems are more likely when you take orlistat with a high-fat meal (if more than 30 percent of calories in the meal are from fat). Side effects usually improve as you learn to avoid high-fat foods. Severe liver injury has been reported rarely in patients taking orlistat, but it is not known if orlistat caused the liver problems [9].

Lorcaserin — Lorcaserin (brand name: Belviq) is a medicine that reduces appetite and thereby reduces body weight in men and women. Lorcaserin appears to have similar efficacy as orlistat. After one year, the mean weight loss is approximately 12.8 pounds (5.8 kg, or approximately 5 to 6 percent of initial weight), compared with 6.4 pounds (2.9 kg, or approximately 2 to 3 percent of initial weight) in the placebo group. Adverse effects of lorcaserin included headache, upper respiratory infections, nasopharyngitis (inflammation in the nose and throat), dizziness, and nausea, occurring in 18, 14.8, 13.4, 8, and 7.5 percent of patients, respectively.

Lorcaserin is usually taken twice daily, with or without food. If you take lorcaserin, your doctor should monitor you closely to evaluate your weight loss. If you do not lose at least 5 percent of your initial body weight within 12 weeks, the medicine should be stopped.

Lorcaserin should not be used in individuals with reduced kidney function or during pregnancy. In addition, lorcaserin should not be used with certain drugs (including many medications used to treat depression). (See "[Patient education: Serotonin syndrome \(The Basics\)](#)".)

Phentermine-topiramate — Phentermine is a medicine that reduces food intake by causing early satiety (a feeling of fullness). Topiramate is used for the prevention of migraine headaches and epilepsy. Patients taking topiramate for these indications lose weight, but the way this works is uncertain. Phentermine and extended-release topiramate are available in combination as a single capsule (brand name: Qsymia). In one-year trials studying phentermine-topiramate, patients taking the medication lose approximately 8 to 10 percent of their initial body weight (mean weight loss 22.4 pounds [10.2 kg]) compared with 1.2 percent in the placebo group (mean weight loss 3.1 pounds [1.4 kg]).

The dose of phentermine-topiramate is usually increased gradually, while weight loss is monitored. If you do not lose 5 percent of your initial body weight after 12 weeks on the highest dose, phentermine-topiramate should be discontinued gradually, as abrupt withdrawal of topiramate can cause seizures.

The most common adverse events are dry mouth (13 to 21 percent), constipation (15 to 17 percent), and a "pins and needles" sensation of the skin. There is also a risk of psychiatric (eg, depression, anxiety) and cognitive (eg, disturbance in attention) adverse events; this risk increases with larger doses of the medication. Although phentermine-topiramate improves blood pressure slightly, it is also associated with an increase in heart rate.

Phentermine-topiramate should not be used during pregnancy because of the risk of birth defects; women of childbearing age should take a pregnancy test before starting this medication (and monthly thereafter) to ensure that they are not pregnant. It should also not be used in people with cardiovascular disease (high blood pressure or coronary heart disease).

Bupropion-naltrexone — Bupropion is a medicine that is used to treat depression and to prevent weight gain in people who are trying to quit smoking. Naltrexone is a drug used to treat alcohol and drug dependence. In a one-year trial studying combination bupropion-naltrexone (in one pill), patients taking the medication lost approximately 5 to 6 percent of their initial body weight (11 to 13 pounds [5 to 6 kg]), compared with 1.3 percent (approximately 3 pounds [1.3 kg]) with placebo. Common adverse effects include nausea (30 percent), headache (17 percent), constipation (19 percent), insomnia, vomiting, dizziness, and dry mouth. Combination bupropion-naltrexone appears to have similar efficacy as but more adverse effects than lorcaserin. (See '[Lorcaserin](#)' above.)

The dose of bupropion-naltrexone is increased gradually over four weeks. If you do not lose at least 5 percent of your initial body weight after 12 weeks, the medication should be discontinued because benefit is unlikely.

Bupropion-naltrexone should not be used in people with uncontrolled high blood pressure, a seizure disorder, or an eating disorder. It should also not be used by people who take (or have recently taken) certain other

medications, including those containing bupropion, chronic opioids (narcotics), or monamine oxidase inhibitors.

Liraglutide — Liraglutide at 3.0 mg/day is approved by the US Food and Drug Administration (FDA) for weight loss. It can be used at a lower dose to treat diabetes. Patients without diabetes taking the highest doses of liraglutide for approximately six months lost 7.4 percent of their initial body weight (16 pounds [7.2 kg]), compared with 4.3 percent (9 pounds [4.1 kg]) in patients taking orlistat. Adverse effects of liraglutide include nausea (37 to 47 percent), vomiting (12 to 14 percent), diarrhea, low blood sugar, and loss of appetite. Serious but less common side effects include pancreatitis, gallbladder disease, renal impairment, and suicidal thoughts.

Liraglutide is injected under the skin in the abdomen, thigh, or upper arm once daily. The initial dose is 0.6 mg daily for one week. The dose can be increased at weekly intervals (1.2, 1.8, 2.4 mg) to the recommended dose of 3 mg. If after 16 weeks you have not lost at least 4 percent of your initial body weight, liraglutide should be discontinued, as it is unlikely to have significant effects after that point. Long-term data (greater than one to two years) on the effectiveness of liraglutide are not available.

Liraglutide should not be used in people with a personal or family history of medullary thyroid cancer or multiple endocrine neoplasia 2A or 2B.

Dietary supplements — Dietary supplements are widely used by people who are trying to lose weight, although the safety and efficacy of these supplements are often unproven. A few of the more common diet supplements are discussed below; none of these are recommended because they have not been studied carefully and there is no proof that they are safe or effective.

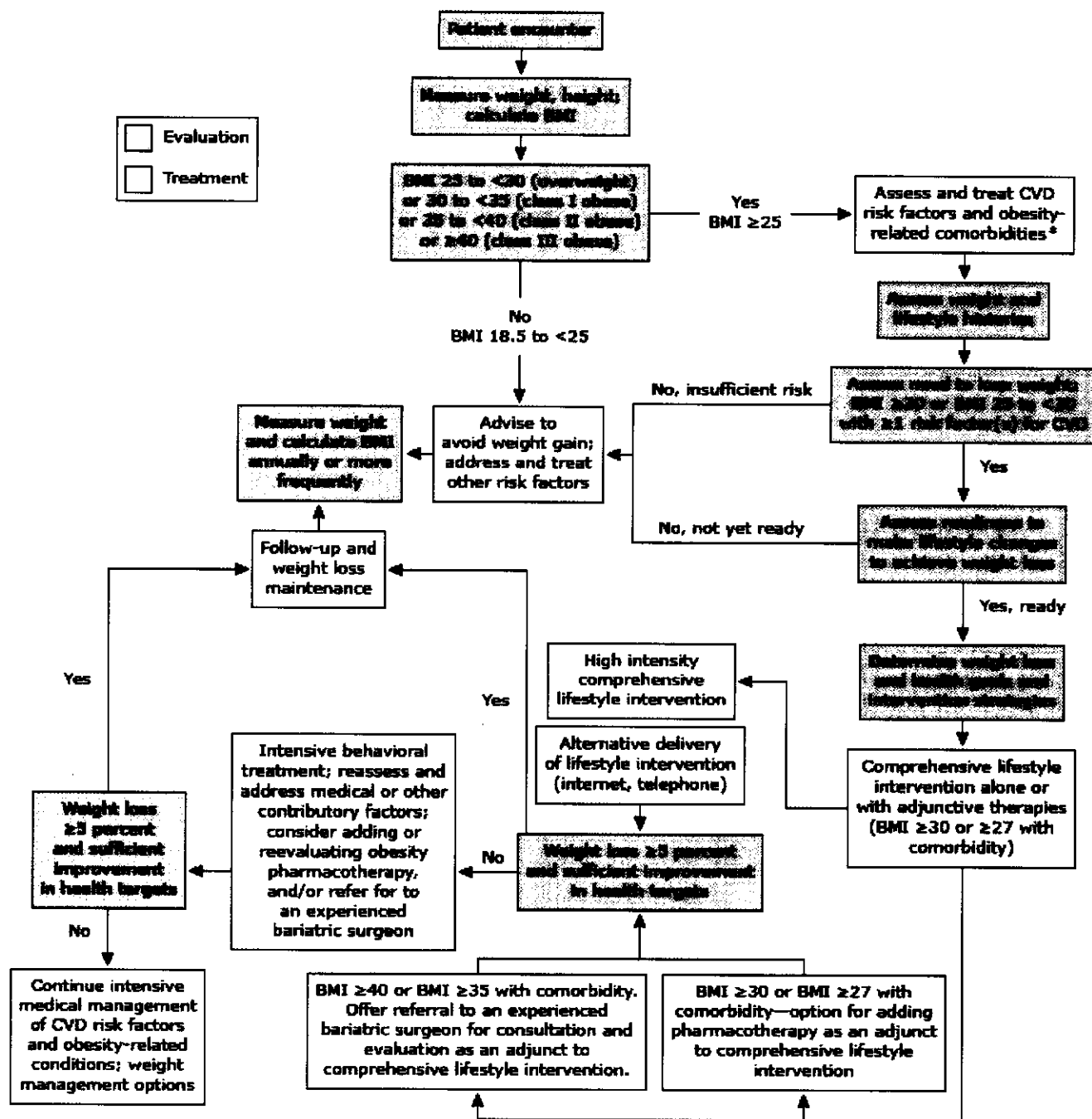
- Chitosan and wheat dextrin are ineffective for weight loss and their use is not recommended.
- Ephedra, a compound related to ephedrine, is no longer available in the United States due to safety concerns. Many nonprescription diet pills previously contained ephedra. Although some studies have shown that ephedra helps with weight loss, there can be serious side effects (psychiatric symptoms, palpitations, and stomach upset), including death.
- There are not enough data about safety and efficacy to recommend chromium, ginseng, glucomannan, green tea, hydroxycitric acid, L-carnitine, psyllium, pyruvate supplements, St. John's wort, and conjugated linoleic acid.
- Two supplements from Brazil, Emagrece Sim (also known as the Brazilian diet pill) and Herbathin dietary supplement, have been shown to contain prescription drugs.
- *Hoodia gordonii* is a dietary supplement derived from a plant in South Africa. It is not recommended because there is no proof that it is safe or effective.
- Bitter orange (*Citrus aurantium*) can increase your heart rate and blood pressure and is not recommended.
- Human chorionic gonadotropin (hCG) is a hormonal preparation, usually given by injection, that has been advertised as a weight loss aid when combined with a very-low-calorie diet. There have been several studies showing that hCG is no more effective than placebo; thus, it is not recommended [10].

WEIGHT LOSS PROCEDURES — Bariatric (stomach) procedures for weight loss are discussed separately (see "[Patient education: Weight loss surgery and procedures \(Beyond the Basics\)](#)").

WHERE TO GET MORE INFORMATION — Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

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Overweight and obesity: Evaluation and treatment algorithm



BMI: body mass index; CVD: cardiovascular disease; BP: blood pressure.

* Assess and treat CVD risk factors and obesity-related comorbidities:

- Assess risk for CVD and/or presence of obesity-related comorbidities. Risk assessment for CVD and diabetes in a person with overweight or class I to III obesity includes history, physical examination, and clinical and laboratory assessments, including BP, fasting blood glucose, and fasting lipid panel (expert opinion). A waist circumference measurement is recommended for individuals with BMI 25 to <35 kg/m² to provide additional information on risk. It is not necessary to measure waist circumference in patients with BMI >35 because the waist circumference will likely be elevated and it will add no additional risk information. The Panel recommends, by expert opinion, using the current cutpoints (>88 cm or >35 in for women and >102 cm or >40 in for men) as indicative of increased cardiometabolic risk.

- Because obesity is associated with increased risk of hypertension, dyslipidemia, diabetes, and a host of other comorbidities, the clinician should assess for associated conditions. The Panel recommends by expert opinion that intensive management of CVD risk factors (hypertension, dyslipidemia, prediabetes or diabetes) or other obesity-related medical conditions (eg, sleep apnea) be instituted if they are found, regardless of weight loss efforts.

Original figure modified for this publication. Jensen MD, Ryan DH, Apovian CM, et al. 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. J Am Coll Cardiol 2013 Nov 7. DOI: 10.1016/j.jacc.2013.11.004. Illustration used with the permission of Elsevier Inc. All rights reserved.

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