



Obesity Prevention and Management

Obesity Guideline Team

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These guidelines should not be construed as including all proper methods of care or excluding other acceptable methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific clinical procedure or treatment must be made by the physician in light of the circumstances presented by the patient.

Patient population: Patients aged 2 years and older seen in primary care.

Objectives: Prevention of obesity; weight management for overweight and obese patients.

Key points

Problem. One-third or more of American adults, adolescents, and children are obese. Obesity rates have tripled in one generation, resulting in increases in associated medical comorbidities and care costs. [C].

Weight classification. BMI (body mass index – weight compared to height, see Table 1) is the primary measure of overweight and obesity. A rising BMI helps identify patients at risk of developing obesity.

Primary prevention. Regular assessment of lifestyle factors (eg, diet, exercise, sleep) identifies patients at risk for excess weight gain [II C]. Preventive lifestyle changes are important. (Tables 2-4.) The most effective approach is to modify unhealthy habits of the entire family [II B].

Screening. Annual assessment of BMI should be recorded and discussed with patients [I D]. Identify patients crossing weight or BMI percentiles, indicating an increased risk for developing obesity [I B].

General approach. Obesity is a sensitive and stigmatized topic. Address it compassionately with a focus on the health benefits of adopting a healthy diet and increasing physical activity [I C]. (Table 2)

Evaluation. (Table 5) For those identified as obese, assess the following:

History: weight and BMI trajectory over time, prior attempts to lose weight, medications predisposing to weight gain, psychosocial factors, family history of obesity and related conditions [I D].

Physical exam: focusing on blood pressure, heart rate, and any signs of related comorbidities (eg, acanthosis nigricans, hirsutism in women) [II B].

Psychosocial assessment: identify motivated patients and also barriers to weight management [II C].

Limited lab panel: lipid panel, fasting blood glucose (or A1c in adults), AST, and ALT [II B].

Treatment

Goal. For children, decrease the rate of weight gain while they grow taller, or 1/2-2 pounds per week of weight loss. For adults, 10% weight loss in 6 months is recommended [I D] (Table 6.)

Lifestyle counseling. Engage patient and family and provide education about self-management. Provide support, identify lifestyle changes, and collaboratively set goals [I A].

Physical activity. Incorporate regular physical activity at least 5 times per week. See Table 3 for type, level, and duration of activity. Decrease sedentary time [I A].

Dietary interventions. Appropriate portion sizes of whole grains, fruits and vegetables, lean meats and dairy. [I D]. Decrease intake of high calorie foods and drinks, including alcohol [I A]. (Table 4.)

Sleep. Inadequate sleep is associated with excess weight gain. See Table 7 for recommendations for sleep duration and how to achieve good quality sleep [II C].

Medications. Identify and modify medications that may contribute to weight gain [I A]. Six FDA-approved medications can result in modest to moderate weight loss when combined with behavioral modifications in certain adult obese patients [II A]. (Table 8.)

Bariatric surgery. Consider for highly motivated obese individuals who are unsuccessful in meeting their initial weight loss goals in 6 months [II B].

Managing comorbid conditions. Identify and manage associated comorbid conditions, eg, CAD, [I B]. Consider the impact of obesity on radiologic studies, procedures, and pharmacologic doses [I A].

Follow-up and monitoring. (Table 9.) Base follow up frequency on risk factors and readiness of patient and family to make lifestyle changes. Consider monthly contact by a member of the care team [II D].

Referrals. Consider referrals to dietitian, multidisciplinary weight-management clinic, bariatric surgery [I A]. Refer for comorbidities as indicated.

Pregnancy. Both preconception obesity and excessive weight gain in pregnancy have maternal and fetal risks and predict long term weight gain in the woman and her offspring [A].

Patient education and resources. See Table 10 for a list of online resources [I D].

Clinical performance. Meaningful Use measures BMI, blood pressure, and diet and activity counseling.

*** Strength of recommendation:**

I = generally should be performed; II = may be reasonable to perform; III = generally should not be performed.

Levels of evidence for the most significant recommendations

A = randomized controlled trials; B = controlled trials, no randomization; C = observational trials; D = opinion of expert panel

Table 1. Weight Classification Using BMI Percentile (Children) and BMI (Adults)

Pediatric BMI Percentile Classification		Adult BMI Classification ^{a, b}	
Underweight	< 5 th percentile	Underweight	< 18.49 kg/m ²
Normal	5 – 84 th	Normal	18.50 – 24.90
Overweight (Pre-obesity)	85 – 94 th	Overweight (Pre-obesity)	25.00 – 29.99
Obesity	≥ 95 th	Obesity Class I	30.00 – 34.99
		Obesity Class II	35.00 – 39.99
		Obesity Class III	> 40.00

^a Patients age ≥ 65 years tend to have increased body fat and decreased lean muscle mass. Depending on individual patient factors, for these patients a BMI < 22 may be below normal and a BMI of 25-30 may be acceptable.

^b If waist circumference is considered:

- Increased risk for metabolic complications for: men with waist > 94 cm (Asian men > 90 cm), and non-pregnant women with waist > 80 cm (Asian women > 80 cm).
- Substantially increased risk for metabolic complications for men with waist > 102 cm, and non-pregnant women with waist > 88 cm.

Instructions on how to measure waist circumference are available at:

http://www.nhlbi.nih.gov/guidelines/obesity/e_txtbk/txgd/4142.htm

Table 2. General Summary of Recommendations for the Prevention of Obesity

<p>Lifestyle Assessment Related to Obesity Risk</p> <ul style="list-style-type: none">• Assess BMI at least annually, and monitor for increasing BMI (or BMI percentile in children).• Review dietary and physical activity habits in addition to sleep duration.• Review other obesity risk factors such as medical comorbidities, familial obesity, medication profile, food insecurity, lack of nutrition knowledge, or lack of food preparation skills. <p>Counseling and Approaches</p> <ul style="list-style-type: none">• Provide healthy lifestyle promotion messages to all patients.• Discuss weight control interventions for overweight patients to prevent the progression to obesity.• Use patient-centered counseling techniques to evaluate what the patient is interested in learning and what they would like to focus on regarding change.• Encourage a self-management approach, including setting goals for healthy lifestyle habits. <p>Physical Activity and Exercise</p> <ul style="list-style-type: none">• Encourage adults and children to engage in regular physical activity and decrease sedentary activity. (See Table 3 for specific physical activity recommendations.) <p>Diet and Eating</p> <ul style="list-style-type: none">• Promote consumption of a variety of nutritious foods. Recommend avoidance of high calorie foods and sugar-sweetened beverages. (See Table 4 for specific dietary recommendations.)• Address environmental and family factors associated with eating.<ul style="list-style-type: none">– Encourage and support breastfeeding during infancy.– Encourage families to create a healthy eating environment that is responsive to hunger and fullness cues.<ul style="list-style-type: none">– Discuss ways to access affordable healthy foods.– Promote family meals; limit eating out and fast food.– Limit children’s screen time and exposure to food and beverage marketing. <p>Sleep</p> <ul style="list-style-type: none">• Promote age-appropriate sleep durations. <p>Let’s Go! 5-2-1-0 (Quick Summary for Children and Adolescents)</p> <p>5 or more servings daily of fruits and vegetables every day. 2 hours or less of recreational screen time daily. (No TV and computer in the bedroom. No screen time under the age of 2.) 1 hour or more of physical activity every day. 0 eliminate or limit sugary drinks; provide water.</p>
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Note: Based on obesity prevention recommendations of several national guidelines. Let’s Go! 5-2-1-0 from <http://www.lets-go.org/>

Table 3. Physical Activity Recommendations with Definitions and Examples

Recommendations	
Children and Adolescents	Minimum of one hour of active play and other activities daily that include moderate or vigorous intensity aerobic physical activity, muscle-strengthening activities, and bone-strengthening activities.
Adults	<p>Aerobic exercise – choose either of the following, or a combination: At least 150 minutes of moderate-intensity exercise weekly: eg, ≥ 30 minutes/day on ≥ 5 days/week. At least 75 minutes of vigorous-intensity exercise weekly: eg, ≥ 20 minutes/day on ≥ 3 days/week.</p> <p>For additional health benefits, also consider: Strength and resistance exercises 2-3 days/week. Neuromotor exercise (balance, agility, and coordination) 2-3 days/week. Flexibility exercises ≥ 2 days/week.</p>

Level of Physical Activity	Definition	Examples
Muscle strengthening		Weight lifting Push-ups and pull ups Tree or rock climbing
Bone strengthening		Weights, resistance bands, Running Brisk walking
Moderate	While performing the physical activity, your breathing and heart rate is noticeably faster, but you can still carry on a conversation (ie, you can talk but cannot sing)	Walking briskly Light yard work (raking and bagging leaves, or using a lawn mower) or snow shoveling Actively playing with children: basketball, playground Biking at a moderate pace
Vigorous	While performing the physical activity, your heart rate is increased substantially and you are breathing too hard and fast to have a conversation (ie, you are not able to say more than a few words without pausing for a breath)	Jogging or running Swimming laps Rollerblading or inline skating at a brisk pace Cross-country skiing Most competitive sports (football, basketball, soccer) Jumping rope

Table 4. Dietary Interventions to Promote Weight Loss

Diet and eating: avoid high calorie, low nutrient foods

Eat a variety of nutritious foods. Encourage and support breastfeeding during infancy.

Emphasize:

Fruits and vegetables – at least 5 servings per day.

Whole grains – look for 100% whole grain and at least 3 grams of dietary fiber per serving.

Fat free or low fat milk and milk products. If lactose-intolerant, choose fat-free lactose-free milk, or fat-free plain soy, almond, or rice milk.

Lean meats, skinless poultry, fish, beans, soy products, eggs, and nuts. Bake, broil, steam, or grill. Avoid frying foods.

Low saturated fats (look for 5% or less on the nutrition facts label). Consider using plant based oils such as olive oil for cooking instead of margarine or butter.

Stay within your daily calorie needs or use the plate method to control caloric intake.

Eliminate or Reduce:

Foods high in saturated fat include fatty meats (eg, bacon, sausage, deli meats, hot dogs), fried foods, full fat dairy products, donuts, cookies, ice cream.

High calorie beverages: sugar-sweetened beverages (regular soft drinks, fruit drinks, fruit punch, sweet tea, sweetened coffee drinks) and alcoholic beverages.

High calorie and low nutrient foods: sweets and junk food such as chips.

Avoid fast food and limit eating out to rare occasions. When eating out, choose grilled or baked fish or chicken, steamed vegetables without butter, salads with low fat dressing on the side. If eating fast food, select a grilled chicken sandwich or veggie burger and a side salad with low fat dressing on the side. Avoid French fries and other fried foods.

Address environmental and family factors associated with eating:

Reduce portions. Use smaller plates. Measure or weigh portions.

Schedule food consumption. Schedule regular meals and snacks throughout the day, starting with breakfast. Avoid excessive snacking.

Help adults increase children’s healthy eating. Promote family meals. Limit eating out and avoid fast food.

Limit young children’s screen time and exposure to food and beverage marketing.

Shop the outside perimeter of the typical grocery store to obtain the basic food groups. Limit the purchase of packaged, processed, and convenience foods.

Read food labels and select low fat, high fiber, and low sodium foods. Choose foods with less than 5 grams of fat per serving. Choose foods with 5 grams or more of fiber per serving. Limit sodium to 300 mg per serving. Be aware that advertising can be deceptive. Low carbohydrate and low fat messaging does not necessarily translate into reduced calories. Review labels for calorie content.

Table 5. History, Physical Examination, Psychological Assessment, and Studies Related to Obesity

<p>History</p> <p>Weight history including details of prior weight loss attempts</p> <p>Ethnicity and family history</p> <p>Dietary habits, eating patterns</p> <p>Physical activity, sleep, and stress</p> <p>Family history of obesity, and genetic predisposition, dietary and activity habits.</p> <p>Medical factors contributing to obesity, such as:</p> <ul style="list-style-type: none"> • medications that can potentiate weight gain: eg, hormonal contraceptives, insulins, thiazolidinediones, sulfonylureas, corticosteroids, anticonvulsants, some antidepressants, atypical antipsychotics. • endocrine abnormalities (rare) <p>Cardiovascular risk factors (if present, need to intensify efforts at risk factor modification):</p> <ul style="list-style-type: none"> • established coronary heart disease (CHD) • atherosclerotic disease • diabetes mellitus or prediabetes • hypertension • obstructive sleep apnea • cigarette smoking • dyslipidemia (LDL > 160, HDL < 35, elevated triglycerides) • family history of premature CHD <p>Ask about the presence and severity of conditions associated with obesity: eg, cancer, polycystic ovarian syndrome, osteoarthritis, cholelithiasis, stress incontinence.</p> <p>Physical Examination</p> <p>Measure height and weight, and calculate BMI.</p> <p>Measure waist circumference.</p> <p>Measure blood pressure and heart rate.</p> <p>Examine for stigmata of obesity related conditions (eg acanthosis nigricans as a marker of insulin resistance).</p> <p>Assess for physical signs of obesity-related comorbidities.</p> <p>Psychological Assessment</p> <p>Assess patient expectations and motivation for weight loss.</p> <p>Screen for the presence or history of eating disorders and mood disorders such as depression.</p> <p>Consider Laboratory and Other Studies</p> <p>Fasting blood glucose, or A1c in adults.</p> <p>Serum lipid profile,</p> <p>Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) to estimate risk of nonalcoholic fatty liver disease in:</p> <ul style="list-style-type: none"> • Children 10-18 years with either BMI ≥ 95th percentile or ≥ 85th percentile with additional risk factors • Adults with BMI ≥ 30 (if patient is Asian, BMI ≥ 27) <p>Additional studies as indicated by comorbidities or history. Consider cardiovascular evaluation if clinically suspected or indicated. Consider endocrine evaluation if thyroid disease, Cushing syndrome, or hypothalamic disease is suspected. Refer patients with early onset, severe childhood obesity to pediatric endocrinology, and consider referral to medical genetics.</p>

Table 6. Starting Goals for Weight Loss

Children	Adults
<p>Children: decrease rate of weight gain while they continue to grow taller.</p> <p>Adolescents with BMI ≥ 99th percentile: ½ to 1 pound a week weight loss is reasonable, maximum is 2 pounds per week</p>	<p>BMI ≤ 30 kg/m² and no significant burden of obesity-related comorbid conditions: 10% weight reduction over 6 months</p>

Table 7. Strategies for Good Sleep Promotion

<p>Children: preschoolers (3-5 years) should get 11-13 hours; school-aged (5-12 years) children should get 10-11 hours.</p> <ul style="list-style-type: none"> • Maintain a daily sleep schedule and consistent bedtime routine. • Establish a relaxing bedtime routine. • Create a quiet, dark, and relaxing bedroom environment. • Establish an environment that is used for sleeping only and not for other activities (not for TV or using the computer) <p>Adolescents and Adults: adolescents (12-18 years) should get 9-10 hours; adults should get 7-8 hours</p> <ul style="list-style-type: none"> • Avoid caffeinated beverages after lunchtime. • Plan to be in bed with lights off at least 7 hours before the time to get up. • Avoid activities that may be arousing around bedtime (eg, playing computer games, texting). • Establish relaxing bedtime activities such as writing in a journal, listening to relaxing music, stretching. • Create a quiet, dark, and relaxing bedroom environment.
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Table 8. FDA-Approved Medications to Treat Obesity *

Name (brand)	Duration of Use	Mechanism	Effect	Side Effects	Contra indications	Form & Dosing	Cost per month **
Liraglutide (Saxenda)	No specified time limitation.	GLP- 1 receptor agonist; increases insulin secretion, decreases glucose production, slows down gut motility/gastric emptying and works in hypothalamus to enhance early satiety.	Adding to lifestyle modifications resulted in placebo subtracted average weight loss of 5.4% from baseline weight. Average weight loss 3.9 to 5.2 kg (8.1 to 11.4 lbs) more than placebo at 56 weeks. ~44 - 62% of patients reached weight loss goal of 5% or greater by 56 weeks (depending on patient population).	Nausea, vomiting, diarrhea, constipation, abdominal pain, dyspepsia, injection site reactions, headache, cholelithiasis, pancreatitis (rare), hypoglycemia (usually in patients with diabetes). in those taking hypoglycemic medications 1 in 18 patients in clinical trials stopped taking liraglutide (3 mg) due to side effects.	Contraindicated in pregnancy and in those with personal or family history of medullary thyroid cancer or multiple endocrine neoplasia syndrome type 2. mutation for MTC Increased risk for hypoglycemia in patients with diabetes; may require adjustment of antidiabetic medications.	Injectable (multi-dose pen). Dose escalation recommended to minimize side effects.: 0.6 mg to 1.2 to 1.8 to 2.4 to 3.0 mg over 5 weeks. Initiate 0.6 mg daily x 1 week, then increase by 0.6 mg daily at weekly intervals to a target dose of 3 mg once daily.	\$90-450 (maintenance dose).
Naltrexone ER / Bupropion ER (Contrave)	Assess response to therapy after 12 weeks at maintenance dosage. If patient has not lost at least 5% of baseline body weight, discontinue treatment.	Mechanism not well understood, but the hypothalamic melanocortin system and the mesolimbic reward system are thought to be the primary targets.	Adding to lifestyle modifications resulted in placebo subtracted average weight loss of 4% from baseline. Average weight loss ≤ 4.1 kg (9 lbs) more than placebo at 56 weeks. < 50% of patients in clinical trials reached the weight loss goal of 5% or greater by one year.	Nausea, vomiting, diarrhea, constipation, headache, insomnia/sleep disorder, dizziness, anxiety, depression, seizure, increase in blood pressure and heart rate, dry mouth, tremor, open angle glaucoma. 1 in 9 patients in clinical trials stopped taking naltrexone ER / bupropion ER due to side effects.	Contraindicated in pregnancy. Hypersensitivity to bupropion, naltrexone, or any other component of the formulation. Use with caution in patients with history of seizures, serious psychiatric illness, drug or alcohol misuse, or eating disorders.	Available as naltrexone 8 mg/bupropion 90 mg tablets. Initiate 1 tab every morning x 1 week, then 1 tab twice daily x 1 week, then 2 tabs every morning + 1 tab every evening x 1 week, then 2 tabs twice daily thereafter. Maintenance dose: naltrexone 16 mg/bupropion 180 mg. Maximum daily dose: naltrexone 32 mg / bupropion 360 mg.	\$300 (maintenance dose). Note: Naltrexone and bupropion are often prescribed separately at different doses; cost will vary.

Table 8. FDA-Approved Medications to Treat Obesity *, continued

Name (brand)	Duration of Use	Mechanism	Effect	Side Effects	Contra indications	Form & Dosing	Cost per month **
Orlistat (Alli, Xenical)	No time limitation. Continue treatment if weight loss of 5% at 12 weeks (4 pounds every 4 weeks). If no weight loss, benefit unlikely from continuing.	Prevents absorption of fat.	Adding to lifestyle modification results in an average 4-7 pounds of additional weight loss in a year.	Gastrointestinal side effects (flatulence, greasy stools) are significant and limit compliance. Risk of vitamin deficiencies and rare cases of liver disease.	Contraindicated in pregnancy, patients with malabsorption disorders, reduced gallbladder function. Use cautiously in patients with obstructed bile duct, impaired liver function, or pancreatic disease.	Capsules OTC: 60 mg tabs. Take with meals that contain fat up to three times per day. Avoid foods with high fat content to minimize gastrointestinal side effects. 120 mg three times per day.	Alli (OTC) \$75 Xenical \$630
Phentermine (several brands)	Short-term: 3 months	Appetite suppressant and sympathomimetic agent	3-5% weight reduction	Monitor blood pressure and heart rate closely. Constipation, dry mouth, and insomnia.	Contraindicated in pregnancy, patients older than 65 years of age, and patients with a history of drug abuse. Relative contraindications are heart disease, high blood pressure, arteriosclerosis, hyperthyroidism, diabetes, glaucoma. Use cautiously in patients on SSRIs, MAO inhibitors, tricyclic antidepressants, and stimulants.	Tablets and extended-release capsules. Either: 8 mg three times daily. Take each dose 30 minutes before meals, with the last dose being taken at least four to six hours before bedtime to prevent insomnia. 15-37.5 mg once daily. Take the dose before breakfast or one to two hours after breakfast.	\$47-70 Generic: \$14-60

Table 8. FDA-Approved Medications to Treat Obesity *, continued

Name (brand)	Duration of Use	Mechanism	Effect	Side Effects	Contra indications	Form & Dosing	Cost per month **
Phentermine + Topiramate (Qsymia)	Extended use (dose of phentermine in combination is lower than when used as a single agent)	Phentermine: reduced appetite and reduced food consumption Topiramate: appetite suppression and increased satiety	Adding to lifestyle modifications results in approximately 5-10% weight loss in a year.	Paresthesias, dizziness, dysgeusia, insomnia, constipation, and dry mouth	Contraindicated in pregnancy, patients older than 65 years of age, and patients with a history of drug abuse. Topiramate is teratogenic. Relative contraindications are heart disease, high blood pressure, arteriosclerosis, hyperthyroidism, diabetes, glaucoma. Use cautiously in patients on SSRIs, MAO inhibitors, tricyclic antidepressants, and stimulants.	Capsules (extended-release) Once daily in the morning. 3.75 mg (phentermine) / 23 mg (topiramate) daily for 14 days, then increase to 7.5 mg/46 mg. Max dose is 15 mg/92 mg. Discontinue (or escalate) if 3% weight loss not achieved in 12 weeks on 7.5 mg/46 mg. Discontinue gradually if 5% weight loss not achieved after 12 weeks on maximum dose.	\$198

* Medications can result in modest to moderate weight loss when added to behavioral modification, and may help to prevent further weight gain after weight loss.

** Brand only unless otherwise listed. Cost = Average Wholesale Price minus 10%. AWP from Lexicomp Online 8/19. For generic drugs, Maximum Allowable Cost plus \$3 from BCBS of Michigan MAC List, 8/19. Pricing for OTC products is based on <http://www.drugstore.com/>

Table 9. Recommendations for Monitoring and Follow-Up

<p>Physical exam, laboratory and other studies</p> <ul style="list-style-type: none">Plot height, weight, BMI (BMI percentile for children) and blood pressure annually.Assess lab levels as indicated.Provide care through planned care visits for follow up of obesity and overweight. <p>Lifestyle assessment</p> <ul style="list-style-type: none">Review physical activity, nutrition, and sleep habits and associated goals.Provide ongoing self-management support. This can be provided by any member of the care team.Follow up on self-management education to reinforce behavior changes.Provide family support and referral to a Registered Dietitian or Social Worker for extensive counseling (if indicated).Offer referral to more intensive weight management interventions or programs for patients not making progress. <p>Self-management support</p> <ul style="list-style-type: none">Deliver consistent, focused messages about healthy lifestyles (such as 5-2-1-0 for children and adolescents).Assess readiness to change and self-efficacy, and provide advice for behavior change consistent with the patient and family's readiness to change.Use a collaborative approach to setting goals.Promote self-management skills.

Table 10. Online Resources

<p>ChooseMyplate.gov- a USDA website designed to promote good nutrition and well-being for Americans</p> <p>Kaboom.org- a non-profit organization that provides a tool to search and review playgrounds</p> <p>Kidseatright.org- a web based resource from the Academy of Nutrition and Dietetics</p> <p>Letsmove.gov- a website that promotes a healthy start for kids, healthy school food, increasing physical activity, increasing access to healthy, affordable food, and empowering parents and caregivers</p> <p>Livestrong.com, Sparkpeople.com, Loseit.com, Myfitnesspal.com- individualized programs to help set calorie needs, track food intake and exercise and provide motivation and support</p> <p>Weightwatchers.com- an online weight loss program that allows participants to lose weight and track their progress at their own pace (there is a cost associated with this program)</p>
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Clinical Problem and Management Issues

Clinical Problem

Prevalence. During the past 50 years, obesity has dramatically increased in the United States. All 50 states had more than a 20% prevalence of obesity. Michigan currently ranks 19th for obesity.

In 2013-2014, the US prevalence of obesity was > 35% in men and 40% in women. One in thirteen Americans has a BMI > 40 kg/m² (severely obese). Higher rates of obesity are found among non-Hispanic black women (57.2%) and Hispanic women (46.9%) than among non-Hispanic white women (38.2%). Among men, 37% of non-Hispanic blacks, 37.9% of Hispanics and 34.7% of non-Hispanic whites have obesity.

Approximately 18.5% of children and adolescents aged two through 19 years are obese (or 13.7 million), triple the rate

from just one generation ago. Over 70% of overweight and obese children become obese adults. Obesity prevalence among children and adolescents in the USA differs significantly by race and ethnicity. 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 non-Hispanic white girls.

One of seven low-income, preschool-aged children is obese, likely due to multiple factors. Lower neighborhood socioeconomic status contributes to overweight and obesity, due to factors including lack of access to shopping venues with healthy foods and lack of access to safe exercise areas. Higher income women are less likely to be obese than low-income women, as are those with college degrees compared to less educated women. Early childhood poverty is associated with accelerated weight gain over the course of childhood into early adulthood. Obesity and education are not related for men. However, among non-Hispanic black

and Mexican-American men, those with higher incomes are more likely to be obese than those with low income.

Risk for other conditions. Obesity is a risk factor for most major causes of death, including cardiovascular disease, numerous cancers, and diabetes, and obesity is linked with markedly diminished life expectancy. Osteoarthritis, gallbladder disease, sleep apnea, respiratory impairment, diminished mobility, low health-related quality-of-life, and social stigmatization are also associated with obesity. Excess weight is a risk factor for cancers of the colon, rectum, prostate, gallbladder, biliary tract, breast, cervix, endometrium, ovary, and thyroid.

Obese children and adolescents have an increased risk of type 2 diabetes mellitus, asthma, and nonalcoholic fatty liver disease. They are more likely to have cardiovascular risk factors, and have greater anesthesia risk. Obese children may also experience more mental health and psychological issues such as depression and low self-esteem compared with non-obese children.

Cost. The direct medical cost of overweight and obesity combined is approximately 5.0% to 10% of US healthcare spending. In 2008 alone the aggregate national cost of overweight and obesity combined was estimated at \$147 billion.

Management Issues

For individuals identified as obese, the person – not the obesity – should be the focus of treatment. The sensitive care of obese patients requires respect and compassion. It is important for clinicians to develop a trusting relationship first by tackling health care goals identified by the patient before addressing weight loss.

The stigma of obesity is common in society, and obese individuals often face negative attitudes and discriminatory behavior. Healthcare professionals may carry negative stereotypical assumptions of obese persons being lazy, non-compliant or less competent. Obese patients often feel unwelcome in medical settings and may choose to ignore or delay seeking attention for their medical problems.

Establishing an alliance between the patient/family and the primary care medical home may facilitate weight loss. All members of the care team within the medical home, including physicians, nurses, dietitians, and social workers, can reinforce the lifestyle changes the patient is trying to achieve. It is important that the entire family attempt to adopt these healthy practices, not just the patient.

Rationale for Recommendations

Multiple consensus committees have established guidelines for the prevention and management of obesity. These include the United States Preventive Services Task Force (USPSTF), the American Academy of Pediatrics (AAP), the Centers for

Disease Control and Prevention (CDC), the National Heart Lung and Blood Institute (NHLBI), the Institute of Medicine (IOM), and others. Common themes in these guidelines include healthy eating and controlling calories, physical activity, behavior modifications, and consideration of medications and surgery when initial efforts are unsuccessful in motivated patients. This guideline summarizes the most recent evidence on obesity management.

Obesity Measurement and Classification

Body mass index (BMI). BMI estimates body fat and is calculated using a person's weight in kilograms divided by the square of their height in meters. BMI is a practical and widely accepted method of classifying obesity and is recommended as a general estimate of body fat. BMI can be calculated in patients 3 years and older. For children, overweight and obesity are classified by BMI percentiles, as compared to children of the same age and sex. For adults, overweight and obesity are classified by the BMI. See Table 1 for BMI classifications.

Adult patients age 65 years and older tend to have an increase in body fat, redistribution of body fat, and decrease in lean muscle mass. Depending on individual patient factors (eg, life expectancy, comorbidities), a BMI < 22 may be below normal and a BMI of 25-30 may be acceptable.

Waist circumference. Waist circumferences may be helpful in classifying individuals with atypical muscle-to-fat ratios. BMI overestimates body fat in very muscular persons. In certain racial and ethnic groups BMI may underestimate body fat. For example, Asians have much greater adiposity per level of BMI.

Centrally distributed obesity is now considered a better indicator for a range of health problems than total body mass. Above a BMI of 35, abdominal obesity has little predictive power of disease risk beyond that of BMI.

Primary Prevention of Obesity

The AAP, the IOM, the USPSTF, the CDC, and other organizations have developed evidence-based recommendations for preventing obesity. These have been integrated into the general recommendations presented in Table 2, with recommendations for physical activity elaborated in Table 3 and recommendations regarding diet incorporated into Table 4.

Pediatric guidelines from the AAP and IOM focus on key factors that influence obesity risk in young children: physical activity, healthy eating, marketing and screen time, and sleep. The AAP's recommendations additionally recognize the importance of social and environmental change to reduce the obesity epidemic in children and adolescents, and also identify ways healthcare providers and health care systems can be part of broader efforts.

Adult guidelines from the USPSTF and CDC primarily focus on diet and physical activity counseling. A USPSTF review updated in 2018 found that the benefit of behavioral counseling in the primary care setting to promote a healthful diet and physical activity is small, and that clinicians may selectively choose to counsel patients. The CDC provides more detailed guidelines on diet and physical activity to prevent obesity. Short sleep duration has additionally been associated with obesity in adults, and adults suffering from sleep deprivation should be counseled on their increased risk of excess weight gain.

Screening for Obesity

Children and adolescents should be screened annually for obesity. For adults a specific screening frequency is less clear, with the National Heart Lung and Blood Institute recommending screening every two years. BMI should be calculated and recorded in the medical record to facilitate monitoring change over time. Waist circumference or waist-to-height ratios may also be useful for interpreting BMI in persons who are very muscular or who have lost muscle mass.

Evaluation

History and physical examination. Developing a weight loss strategy involves a risk assessment through a comprehensive history and a focused physical examination. Important obesity-specific issues to consider on history-taking and examination are listed in Table 5.

Blood pressure. Measuring blood pressure is important, requiring appropriate cuff sizes for obese patients. Blood pressure should be measured annually and tracked in the medical record for all patients 3 years and older. Following recommended practice for blood pressure measurement is important. (See UMHS clinical guideline for [Essential Hypertension](#).)

Laboratory and other studies. Determining which studies are indicated in the evaluation and management of excess weight is somewhat controversial. Commonly recommended studies are listed in Table 5. If baseline studies are normal, repeating them in a two-year interval is reasonable.

Treatment

Management of overweight patients focuses primarily on lifestyle changes such as diet, physical activity, sleep and stress reduction. A combination of physical activity and dietary changes has been found to be most effective for weight loss. If these measures are unsuccessful after 6 months, then medications, surgery, and other referrals may be required.

Small concrete changes that focus on lifestyle change, behavior modification, healthy eating and physical activity are most likely to be successful in the long run. Progress should be measured on lifestyle change as much as weight

parameters, as it is known that modifying diet and activity can have positive health consequences even in the absence of weight loss.

Lifestyle counseling. Even within a limited time visit, providers can promote a healthy lifestyle and influence patient behavior.

Lifestyle counseling includes self-management education and support, identifying lifestyle changes, and collaborative goal setting between the provider and patient. The provider works with the patient to identify the patient's biggest concern regarding change. Examples of modifiable behaviors to target include physical activity and television viewing. Using open ended questions and listening skills, the provider helps the patient explore any issues and works collaboratively with the patient to establish a self-management goal.

Additional for children and adolescents. Management of obesity involves the entire family. Engagement of family members is important for adults and parental involvement is critical for children. Lifestyle changes are greatly facilitated by supporting changes in the environment. Individual counseling and web-based weight-loss programs are much less successful in promoting lifestyle changes for children than group-based or family-based treatments. Recent studies have shown that many parents perceive that their overweight child is of normal weight. If the family does not perceive that the child is obese, or if they will not cooperate with lifestyle changes, then office-based interventions for pediatric obesity will not be successful.

Additional for adults. Lifestyle counseling is intended to help patients make informed decisions, identify and overcome barriers, provide health education and appropriate care recommendations, and provide self-management support. Important steps include:

- Initiating a discussion about nutrition and physical activity.
- Helping the patient set goals.
- Encouraging open communication between the patient and health care provider.
- Following up on the patient's progress.

The healthcare team can be utilized to provide extended support.

Treatment goals. The adverse health outcomes associated with obesity depend on several factors, including the presence of other risks and comorbid conditions, such as cigarette smoking, family history, hypertension, dyslipidemia, diabetes mellitus, etc. Thus, clinicians should determine treatment goals keeping these in mind, rather than on the basis of weight alone.

General goals of weight management in obese persons are:

- Reduce body weight.
- Sustain weight loss by minimizing risk of weight gain.
- Prevent further weight gain.

Weight loss goals should be individualized and aimed at the long term. Starting points for developing individual goals are summarized in Table 6.

Additional for children and adolescents. In growing children, slowing the rate of weight gain while they continue to get taller will result in a decreased BMI over time. For adolescents with BMI at the 99th percentile or higher, ½ to 1 pound per week weight loss goals may be reasonable. A simple approach for children and families is the “5-2-1-0” plan promoted by the Let’s Move initiative (see Table 2).

Additional for adults. A reduction in body weight by approximately 10 percent over a span of 6 months is a reasonable initial goal for weight loss therapy. This level of modest loss can be maintained over time. Depending on the BMI, this corresponds to an average energy deficit of approximately 500 – 1000 kcal per day, resulting in a weight loss rate of 1 to 2 pounds per week. The corresponding calories per day for individuals of average height, weight, and activity level are 1800-2000 for men and 1300-1500 for women. Individualized targets for reduced calorie intake can be calculated by dietitians or estimated using free online weight loss calorie calculators. Subsequent weight loss strategy will depend upon the initial amount of weight loss.

A greater weight loss (eg, 20% or more over 6 months) may be considered for persons with BMI > 35 kg/m² or those with a significant burden of obesity-related comorbid conditions.

Physical activity. Recommended basic activity goals are presented in Table 3 along with categories of activity levels, their definitions, and examples.

Additional for children. Children should participate in physical activities that are age-appropriate, enjoyable, and that offer variety. Intensive family-based programs have been found to lead to sustained weight loss in children.

The average child spends 7.5 hours per day in front of a screen, including watching television, using the computer, or playing video games. The more time children spend in front of a screen, the higher their risk of obesity. Children and adolescents should limit their screen time to no more than one to two hours of quality programming daily.

Additional for adults. CDC recommends a gradual increase in physical activity toward a daily goal of 60 to 90 minutes of moderate-intensity physical activity to sustain weight loss. To help maintain weight and prevent weight gain, adults should engage in approximately 60 minutes of moderate- to vigorous-intensity activity on most days of the week.

Older adults and those with chronic medical conditions limiting physical activity should be as physically active as their abilities allow. Those at risk of falling should also do exercises to improve balance.

Dietary intervention. General dietary recommendations to promote weight loss are summarized in Table 4. These recommendations apply to children and adults.

Additional for children. While the basic interventions are the same as for adults, the focus should be on family diet changes not just the overweight child.

Additional for adults. Decrease total calories by 500 to 1,000 per day to achieve a weight loss of 1 to 2 pounds per week.

Sleep. Short sleep duration is associated with an increased risk for excessive weight gain and obesity. Clinicians should counsel patients and families on appropriate sleep requirements. Recommendations for age-appropriate sleep durations and strategies for good sleep for children and adults are presented in Table 7.

Medications. Weight loss medications are not recommended for children or adolescents. For adult patients, medications typically result in only modest to moderate weight loss, but may help prevent further weight gain. Medications may be considered for adults with BMI > 30 kg/m² or with BMI > 27 kg/m² and significant medical complications, if diet and activity modifications do not result in weight loss of 5% at 3 months and 10% after 6 months.

Phentermine (short term only) and orlistat are FDA-approved for weight loss in conjunction with lifestyle intervention when lifestyle intervention alone is unsuccessful. The use of these two approved drugs is described in Table 8. Three additional weight loss medications were approved by the FDA in 2012: a combination of phentermine and topiramate (available as Qsymia), liraglutide (Saxenda), and naltrexone ER/bupropion ER (Contrave). All six drugs are contraindicated in pregnancy – use with caution in women of childbearing age.

Metformin led to a 1.5-cm greater decrease in waist circumference; however, its use for obesity is not approved by the FDA and is thus considered an off-label use.

Medications that have been approved for other indications that are employed in off-label use for obesity and can promote short-term modest weight loss include: bupropion, zonisamide, and topiramate. However, the USPSTF found no evidence of benefit regarding maintenance of improvement in weight after discontinuation of these medications.

In general, over-the-counter (OTC) medications are not recommended for weight loss. The exception is the OTC version of orlistat, which is marked as Alli.

Multidisciplinary weight management programs. The most effective strategies for weight management employ a multidisciplinary team working in concert to achieve individualized weight loss goals. At Michigan Medicine information is available at:

Multidisciplinary teams typically include:

Physician: evaluates, assesses risk, counsels the patient, coordinates care of the team, and can refer to specialists as needed.

Dietitian: delivers tailored nutritional information appropriate to the patient's preferences and lifestyle.

Exercise physiologist: assesses a patient's capacity for exercise, and prescribes a regimen that can be done at home, at a gym, or in one-on-one session.

Behavioral therapist: offers standard behavioral or cognitive behavioral therapy.

Endocrinologist: evaluates for secondary causes of obesity, evaluates and treats complications of obesity such as diabetes, and prescribes pharmacotherapy when lifestyle intervention alone results in little success.

Bariatric surgery. When other approaches have not resulted in adequate weight control, bariatric surgery may be considered. While bariatric surgery results in significantly greater weight loss than conventional treatment for obese adults, surgery is associated with a greater risk of complications and requires lifelong intake of certain micronutrients and vitamins. Bariatric surgery has been found to reduce or resolve obesity-related medical comorbidities including diabetes (depending on duration of the disease) and hypertension.

Bariatric surgery may be considered for patients with a BMI > 40, or BMI > 35 with weight-related health complications (eg, hypertension, heart disease, diabetes, polyarthritis, pulmonary hypertension, sleep apnea, or hyperlipidemia). Before bariatric surgery will be performed, most surgeons and insurers require documented compliance with a medically supervised weight loss program for a minimum of six months (including monthly documentation of weight, dietary, exercise, and lifestyle modifications at each visit) without achieving significant weight loss. The supervised weight loss program usually should have occurred within the past 2 years, although some insurance companies will include the past 4 years. Absolute contraindications to bariatric surgery include pregnancy, lactation, active substance abuse, end-stage cardiovascular disease, severe or uncontrolled psychiatric disorders, and anorexia nervosa. Relative contraindications include unstable medical conditions, end-stage renal disease, active binge eating disorder, or bulimia nervosa.

Managing comorbid conditions. Obese patients frequently have or develop comorbid conditions. The specifics of managing comorbid conditions are beyond the scope of this guideline. See the [list of UMHS clinical guidelines](#) for recommendations concerning some common comorbid conditions, including coronary artery disease, depression, diabetes, heart failure, hypertension, and lipid management.

Obesity can affect the diagnosis and treatment of the patient's other conditions. The effects are noteworthy for:

- **Pharmacologic dosing.** Based on their pharmacokinetic profile, drugs differ in their volume of distribution depending on the amount of body fat.
- **Radiologic studies and procedures.** The amount of subcutaneous adipose tissue influences the quality of the results of various radiologic modalities. The results of ultrasonography and x-ray examinations are particularly vulnerable to the effects of subcutaneous fat.

Follow-up and Monitoring

The weight and BMI of all patients should be routinely monitored at each visit, or at least annually. Factors associated with overweight and obesity that should be monitored are summarized in Table 9. Follow up visits should include behavioral counseling and addressing the patient's goals. If goals have not been achieved, the clinician should re-assess the reasons for failure to meet goals. If significant obesity persists and the obesity-associated risk factors remain, consider referral to a higher level of weight management.

Referrals

Primary care providers should initially manage overweight and obesity. For patients who are motivated but not making progress meeting their diet and exercise goals, referrals can be helpful. Referrals may also be indicated to manage comorbidities. Common referrals are to the following:

Intensive multidisciplinary obesity program for patients with severe obesity who are making little or limited progress.

Registered dietitian for help with dietary modifications.

Endocrinologist for adult patients with BMI > 30 whose excess weight may be due to an endocrine disorder.

Physical Medicine and Rehabilitation for patients with arthritis, joint, or mobility concerns.

Social work and mental health for issues regarding personal resources and emotional concerns.

Surgeon for consideration of bariatric surgery (see requirements of patients, listed in the bariatric surgery section above).

Special Populations

Pregnancy

Excessive weight gain during pregnancy (eg, > 35 pounds for normal weight women) is an additional predictor of long-term weight gain and obesity of women, and has maternal and fetal risks. In 2009 the IOM provided an updated guideline on recommended weight gain in pregnancy. Delivering an organized, consistent program of dietary and lifestyle counseling has been found to reduce weight gain in pregnancy. Ideally, weight management should be discussed with women prior to conceiving and every effort should be made to reduce weight in those with overweight or obesity prior to becoming pregnant.

Patient education and resources

Some useful online resources are listed in Table 10.

Strategy for Literature Search

The team began the search of literature by accepting the results of a literature search performed for fairly recent systematic reviews (see “annotated references” for full citation): Scottish Intercollegiate Guidelines Network (SIGN). Management of obesity. A national clinical guideline, 2010. The search addressed obesity in children and adults in literature through 2007.

To update that search, a systematic search of literature on Medline was performed. The major search parameters were: topic of obesity, time frame from 1/1/08 – 2/14/12; type of publication was guidelines, controlled trials (including meta-analyses), and cohort studies; population was human ages 2 and above (children and adults); and language was English.

Within these parameters individual searches were performed for the following topics: differences by gender, race, age, low SES, urban/rural; prevention; screening; history (health risk, risk for comorbidities, medications, prior weight loss attempt); BMI measurement; blood pressure; physical exam, signs; laboratory testing; treatment barriers, change readiness; treatment goals; addressing barriers; education; family involvement; motivational interviewing; dietary interventions; physical activity; medications; monitoring/follow-up; special programs; bariatric surgery; other references not included in any of the preceding individual searches.

Related National Guidelines

The UMHS Clinical Guideline on Obesity is consistent with:

AHA/ACC Guideline on Lifestyle Management to Reduce Cardiovascular Risk (2013)

AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

American Academy of Pediatrics. Prevention, Assessment, and Treatment of Pediatric and Adolescent Overweight and Obesity (2007)

American College of Sports Medicine, Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise (2011)

Centers for Disease Control and Prevention:
Healthy Eating for Healthy weight (2011)
Physical activity for a healthy weight (2011)

Institute of Medicine:

Weight Gain During Pregnancy (2009)

Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation (2012)

National Institutes of Health (NHLBI, NIDDKD). Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults (1998)

US Preventive Services Task Force:

Screening for Obesity in Children and Adolescents (2010)

Counseling to Promote Physical Activity and a Healthful Diet to Prevent Cardiovascular Disease in Adults (2012)

Screening for and Management of Obesity in Adults (2012)

Measures of Clinical Performance

National programs that have clinical performance measures concerning obesity and weight management include the following.

Centers for Medicare & Medicaid Services (CMMS):

- Clinical Quality Measures for financial incentives for Meaningful Use of certified Electronic Health Record technology (MU)
- Quality measures for Accountable Care Organizations (ACO)

Blue Cross Blue Shield of Michigan (BCBSM) and Blue Care Network (BCN):

- Provider Group Incentive Program (PGIP)
- Pay for Performance Program (PRP)

These programs have clinical performance measures for obesity management addressed in this guideline. While specific measurement details vary (eg, method of data collection, population inclusions and exclusions), the general measures are summarized below.

Adult: BMI documented. Percentage of patients aged 18 years and older with a body mass index (BMI) in the past 6 months or during the current visit documented in the medical record. (CMMS, BCN, BCBSM)

Adult: Follow-up plan. If the most recent BMI is outside parameters, a follow-up plan is documented. Parameters: Age 65 and older BMI greater than or equal to 30 OR < 22; Age 18-64 BMI greater than or equal to 25 OR < 18.5. (ACO, MU)

Pediatric: BMI classified. Percent children, 2 through 17 years of age, whose weight is classified based on BMI Percentile for age and gender. (CMMS, BCN, BCBSM)

Pediatric: Nutrition counseling. The percent of patients 3-17 years old as of December 31 of the measurement year who had a visit with a PCP or OB/GYN during the measurement year who had counseling for nutrition during the measurement year. (CMMS, BCN, BCBSM)

Pediatric: Physical activity. The percent of patients 3-17 years old as of December 31 of the measurement year who had a visit with a PCP or OB/GYN during the measurement year who had counseling for physical activity during the

Disclosures

The University of Michigan Health System endorses the Guidelines of the Association of American Medical Colleges and the Standards of the Accreditation Council for Continuing Medical Education that the individuals who present educational activities disclose significant relationships with commercial companies whose products or services are discussed. Disclosure of a relationship is not intended to suggest bias in the information presented, but is made to provide readers with information that might be of potential importance to their evaluation of the information.

None of the members of the guideline team have a personal financial relationship with a commercial interest whose products or services are addressed in this guideline.

Review and Endorsement

Drafts of this guideline were reviewed in clinical conferences and by distribution for comment within departments and divisions of the University of Michigan Medical School to which the content is most relevant: Family Medicine; General Medicine; General Pediatrics; Metabolism, Endocrinology & Diabetes; Pediatric Medical Surgical Joint Practice Committee, and Mott Executive Committee. The Executive Committee for Clinical Affairs of the University of Michigan Hospitals and Health Centers endorsed the final version.

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