

Weight Management Screening and Intervention Guideline

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Last guideline approval: August 2018

Guidelines are systematically developed statements to assist patients and providers in choosing appropriate health care for specific clinical conditions. While guidelines are useful aids to assist providers in determining appropriate practices for many patients with specific clinical problems or prevention issues, guidelines are not meant to replace the clinical judgment of the individual provider or establish a standard of care. The recommendations contained in the guidelines may not be appropriate for use in all circumstances. The inclusion of a recommendation in a guideline does not imply coverage. A decision to adopt any particular recommendation must be made by the provider in light of the circumstances presented by the individual patient.

Summary of Changes as of August 2018

- We have combined the recommendations for adults and for children/adolescents into a single guideline. Previously, these were separate guidelines.
- We now categorize obesity by class (Class I, II, or III), in alignment with KP National, the USPSTF, and the ICD-10 coding system.
- We added a comparison of the most common diets used for weight loss, including the level of evidence and the effectiveness for weight loss in the short and long term.
- We no longer recommend any weight-loss medications. Previously we recommended orlistat for patients with a BMI of 30 or higher or patients with a BMI of above 25 with comorbidities. Information on the effectiveness and side effects of the common weight-loss medications has been added to the guideline.
- We added links to scripting resources to help providers foster positive weight-related conversations with patients, including children/teens and their parents. Information on two new options for behavior change counseling—through Wellness Coaching and Community Resource Specialists—has also been added.
- Gastric banding is no longer a recommended bariatric surgery option due to its high complication rate and poor functional outcomes.

Background: What Is Obesity?

Beginning in 2013, obesity was recognized by the American Medical Association and World Health Organization as a chronic disease like diabetes, hypertension, or heart disease. Obesity is closely associated with a range of health problems, such as obstructive sleep apnea, arthritis, GERD, hypertension, dyslipidemia, atherosclerosis, and type 2 diabetes. It often produces measurable metabolic changes, such as insulin resistance and abnormal leptin and ghrelin levels.

Because of a perception that the disease is “their fault,” patients with obesity experience discrimination and stigmatization by health care providers of all levels and by society as a whole (Puhl 2010). It is vitally important to give patients with obesity the same care and compassion as any other patient to help them manage this complex chronic disease.

Obesity defined

For **adult patients** (aged 20 years and older), obesity is defined as a body mass index (BMI) of 30 kg/m² or higher.

For **children and adolescents** (aged 2–19 years), obesity is defined as a BMI at or above the 95th BMI-for-age percentile. The BMI percentile indicates the relative position of the child’s BMI number among children of the same age and gender.

Weight loss can improve fasting glucose levels, type 2 diabetes, dyslipidemia, hypertension, coronary heart disease, obstructive sleep apnea, osteoarthritis, and degenerative joint disease (NIH 1998, WHO 2000).

Screening

The U.S. Preventive Services Task Force (USPSTF) recommends that clinicians screen all patients aged 6 years and older for obesity.

Body mass index (BMI) calculation

BMI is calculated by measuring weight in kilograms, then dividing by height in meters squared (kg/m²). BMI should be assessed at:

- Every visit in primary and consultative care.
- Every hospital admission.

Adults

CDC BMI calculator

https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/english_bmi_calculator/bmi_calculator.html

Children and adolescents

CDC BMI percentile calculator

<https://www.cdc.gov/healthyweight/bmi/calculator.html>

Waist circumference

Adults

Waist circumference may be used in addition to BMI to assess for risk of obesity-related comorbidities. Men with a waist circumference ≥ 40 inches (≥ 102 cm) and women with a waist circumference ≥ 35 inches (≥ 88 cm) are at increased risk for obesity-related health problems.

Note: Ethnicity may impact body fat percentage and distribution. For example, people of Asian descent tend to have more total fat and visceral fat than whites and may be at higher risk for developing diabetes at the same BMI. Typically, Asians with a waist circumference ≥ 35 inches (≥ 90 cm) for men and ≥ 31 inches (≥ 80 cm) for women are considered at increased risk.

For additional information on BMI and waist circumference, see the CDC's Healthy Weight website (<https://www.cdc.gov/healthyweight/assessing/>).

Children and adolescents

There is insufficient evidence regarding the utility of measuring waist circumference among children and adolescents to predict future health risks.

Diagnosis

Note: BMI does not account for the difference between lean and fat body mass. Therefore, it is possible for a healthy, muscular individual with low body fat to be classified as overweight or obese using the BMI formula.

Adults

Table 1. Adult weight classification by BMI

Note: The coexistence of dyslipidemia, hypertension, coronary heart disease, diabetes, sleep apnea, and/or severe osteoporosis increases an individual's health risk above what would be predicted by BMI alone.

Clinical classification	BMI
Underweight	Lower than 18.5
Normal weight	18.5–24.9
Overweight	25.0–29.9
Obesity	30.0 and higher
Obesity – Class I	30.0–34.9
Obesity – Class II	35.0–39.9
Obesity – Class III (severe)	40.0 and higher

Children and adolescents

Clinical classification	BMI percentile
Healthy weight	5 th –84 th percentile
Overweight	85 th –94 th percentile
Obesity	At or above 95 th percentile

¹ The BMI percentile indicates the relative position of the child's BMI number among children of the same age and gender.

Contributing causes of overweight and obesity in children and adolescents include psychosocial factors such as depression and abuse. Rare causes of weight gain include neuroendocrine disorders (e.g., hypothyroidism, Cushing's syndrome, hypogonadism, and growth hormone deficiency) and genetic disorders (e.g., Prader-Willi syndrome, Alstrom-Hallgren syndrome, and Carpenter syndrome).

Lab testing

There are no routine lab tests recommended for diagnosing obesity. Most overweight and obesity is due to energy imbalance.

It is common for patients and their families to seek out other medical reasons that can occasionally factor in to becoming overweight. We do not recommend routinely screening for such reasons, but we do recommend a complete history and physical exam for any overweight or obese patient, including further evaluation for contributing causes if indicated.

Weight Goals

Adults

For most patients with a BMI of 25.0 or higher, 5–10% weight loss over 6 months is a realistic initial goal. When the patient has reached and maintained the initial goal weight for 12 months or more, consider setting a new goal.

Children and adolescents

Use clinical judgment to set weight goals for growing children, depending on degree of obesity, presence of comorbidities, and stage of growth and development.

Interventions

The primary goal of any intervention is behavior change that results in healthy eating and regular physical activity.

Table 3. Recommended interventions by BMI/BMI percentile				
	Offer behavior change counseling & lifestyle modifications	Offer intensive multicomponent behavioral intervention if available	Consider bariatric surgery ¹	Drug therapy
Adults				
BMI ≥ 25	Yes	Yes, if comorbidities	—	Limited efficacy, multiple side effects, no long-term studies.
BMI ≥ 30 Obesity Class I	Yes	Yes	If patient has uncontrolled diabetes. ²	
BMI ≥ 35 Obesity Class II	Yes	Yes	If patient has other comorbidities. ³	Contraindicated in pregnancy.
BMI ≥ 40 Obesity Class III	Yes	Yes	For all patients, regardless of comorbidities.	
Children and adolescents				
BMI percentile 85–94	Yes	—	Insufficient evidence to support recommendation for or against.	Not recommended for this age group.
BMI percentile ≥ 95	Yes	Offer starting at age 6 years (USPSTF).		
¹ Coverage for bariatric surgery varies by plan. ² The KPWA Medical Policy Committee is currently considering coverage of bariatric surgery for diabetics who have inadequately controlled hyperglycemia (HbA1c > 8.0%) despite optimal medical treatment (e.g., oral medication, insulin). Final decision pending in late 2018. ³ Comorbidities include hypertension, coronary heart disease, type 2 diabetes, and obstructive sleep apnea.				

Behavior change counseling

Behavior change counseling is primarily done by **primary care providers**.

Community Resource Specialists are also available in every primary care clinic to work with patients. These specialists use motivational interviewing to help patients with behavior change to achieve weight management goals determined by the patient and provider. The coaching may be by telephone, face-to-face, or via virtual consultation, and is documented in Epic.

Helpful websites on fostering positive weight-related conversations with sample motivational interviewing scripts include:

- Fostering Positive Weight-Related Conversations from the Holland Bloorview Kids Rehabilitation Hospital:
<http://research.hollandbloorview.ca/Assets/Research/Documents/Research%20Centres%20and%20Labs/ProFILE%20Lab/KTCasebook-2017-12-11.pdf>
- Sample Scripts for Stages of Change from the UCLA Center for Human Nutrition:
http://www.cellinteractive.com/ucla/phycian_ed/scripts_for_change.html

Wellness coaching is available by phone to all Kaiser Permanente members aged 18 and older at **no cost**. Members can receive coaching for weight management, healthy eating, physical activity, and stress. The wellness coaches are Kaiser Permanente staff trained in motivational interviewing and behavioral counseling. All coaches are Master's level Allied Clinicians who have received certification in a Health and Wellness Coaching Certification program. All the coaches have additional licenses and certifications in disciplines specific to their degrees.

Lifestyle modification resources

Community Resource Specialists also provide referrals to resources in the local community to help patients achieve sustainable lifestyle changes. The community referrals provided vary by clinic location but may include healthy eating classes, diabetes support groups, group exercise programs such as Silver Sneakers, and nearby gyms.

Helpful websites on nutrition and physical activity for adults include

- Dietary Guidelines for Americans 2015–2020: https://health.gov/dietaryguidelines/2015/resources/DGA_Recommendations-At-A-Glance.pdf
- USDA ChooseMyPlate: <https://www.choosemyplate.gov>.

A great **resource for parents** is the Kids Eat Right website (www.eatright.org/kids/), which provides information on cooking, shopping, and healthy lifestyle choices for children of all ages.

Diets and commercial weight-loss programs

Successful weight management depends less on the diet or weight-loss program chosen than on the consistency and continuity of healthy nutritional choices throughout the patient's life. Be aware that some patients' diet-program choices may have adverse physiologic effects on blood glucose, blood pressure, and/or lipids.

Commercial diet or weight-loss programs may help with weight management; examples include Jenny Craig (for ages 13 and up) and Weight Watchers (for ages 10 and up). There are many popular programs, with varying levels of evidence on their effectiveness.

It is important for patients to avoid any programs that promise a “quick fix” or make unrealistic claims. When choosing a program—regardless of the type (in-person, web-based, or phone-based)—patients should make sure that it:

- Focuses on long-term lifestyle change.
- Addresses both healthy eating and exercise.
- Sets realistic short-term goals (i.e., loss of 5–10% current total body weight).
- Promotes gradual weight loss. For adults, this means 0.5–2.0 lb per week. For children and teens, this means no more than 0.5 lb per week for younger children, and up to 2.0 lb per week for adult-sized adolescents.
- Has a program to maintain goal weight once reached.
- Includes behavior modification (e.g., meal planning, food diary).

Table 4. Comparison of weight-loss diets**Note:** Any of the diets listed below are reasonable choices for weight loss.

Diet	Level of evidence	Comments
Mediterranean diet	Moderate to low	<ul style="list-style-type: none"> Comparable weight loss to low fat diet Moderate evidence of decreased cardiovascular risk
Low-carbohydrate diet (< 130 g/day)	Moderate to low	<ul style="list-style-type: none"> Reduced more weight than control at less than 12 months No difference in weight loss than control beyond 12 months Reduced more fat mass than control over 12 months and beyond LDL level may be increased
Very low-carb diet (< 30 g/day)	Low	<ul style="list-style-type: none"> More effective than control in reducing weight and fat mass over 12 months
Low-fat diet	Low	<ul style="list-style-type: none"> Comparable weight reduction to low-carb diets at 12 months
Vegan diet	Low	<ul style="list-style-type: none"> Slightly more weight loss than non-vegan diets May decrease LDL, cholesterol, and glucose levels
Low glycemic index	Low	<ul style="list-style-type: none"> Does not provide higher weight loss than high glycemic diets
Very low-energy diet (< 800 kcal/day)	Low	<ul style="list-style-type: none"> Effective for short-term weight loss at 6 months Outcome improved when combined with behavioral program

Bariatric surgery

Children and adolescents

There is insufficient evidence to recommend for or against bariatric surgery for adolescents. The current minimum age for bariatric surgery at KPWA is 20 years.

Adults

The consensus opinion of the KPWA guideline team is that clinicians should discuss behavioral weight-loss programs with patients considering bariatric surgery. Bariatric surgery may be an option for the individuals below. The following comorbidities and risk factors can be improved with surgery: impaired fasting glucose, type 2 diabetes, dyslipidemia, hypertension, coronary heart disease, obstructive sleep apnea, osteoarthritis, and degenerative joint disease (NIH 1998, WHO 2000).

Table 5. Recommendations for bariatric surgery to assist adults with weight loss

Eligible patients ¹	Details
BMI 40.0 or higher	Roux-en-Y gastric bypass and vertical sleeve gastrectomy are the most commonly performed types of bariatric surgery at KPWA.
BMI 35.0 to 39.9 with comorbidities ^{2,3}	
¹ 20 years of age or older.	
² Comorbidities include one or more of the following: uncontrolled hypertension (as defined by consistent BP of 140/90 with repeated measurements and uncontrolled after trial of at least two different anti-hypertensive medications), type 2 diabetes (for 1 year or longer and on one or more diabetes medications), and/or severe obstructive sleep apnea (defined by AHI > 15 on sleep study).	
³ The KPWA Medical Policy Committee is considering coverage of bariatric surgery for diabetics with BMI ≥ 30 who have inadequately controlled hyperglycemia (HbA1c > 8.0%) despite optimal medical treatment (e.g., oral medication, insulin). Final decision pending in late 2018.	

Note: Gastric banding is no longer a recommended bariatric surgery option due to its high complication rate and poor functional outcomes.

For information about patient eligibility, see [Clinical Review Criteria: Bariatric Surgery](#) and [Referral Checklist](#).

Bariatric surgery candidates are required to complete a medical and psychological assessment (based on protocol and their particular health history), attend a mandatory bariatric education class, and meet individually with one of the bariatric surgeons. For more information about the bariatric program, see [Bariatric Benefit](#).

The bariatric team expects to follow patients for 5 years after surgery. Labs (e.g., complete blood count, vitamin B12) are done at bariatric follow-ups at 6 months, at 1 year, and yearly thereafter.

After 5 years, patients are referred to their primary care physicians for yearly bariatric labs and follow-ups, to include:

- Albumin
- Prealbumin
- Magnesium
- CBC
- CMP
- PTH-intact
- Cholesterol panel for history of dyslipidemia
- Vitamin B12
- Iron/TBIC
- HbA1c if diabetic
- 25-hydroxy (vitamin D)
- Iron, ferritin, TIBC
- Vitamin A
- Thiamin
- Copper
- Zinc
- Folate

All labs are to be done with the patient in a fasting state.

Patients are expected to continue seeing their primary care physicians for management of comorbidities and routine non-bariatric care.

Pharmacotherapy

Children and adolescents

Pharmacotherapy is **not recommended** for children and adolescents for the treatment of obesity.

Adults

Pharmacotherapy is **not recommended** for adults for the treatment of obesity.

- Pharmacotherapy has efficacy in the short term in combination with lifestyle changes.
- Most patients taking weight-loss medications experience some side effects.
- Very few studies of obesity medications have demonstrated sustained weight maintenance after discontinuation of the drug.
- No long-term studies are available (periods range from 28 weeks to 2 years).
- Effects on cardiovascular morbidity and mortality have not been established.
- All obesity medications are contraindicated in pregnancy.

Table 6. Obesity medication comparison

For more detail and dosing information, see the Kaiser Permanente National Guideline.

Medication	Effectiveness	Side effects/harms/precautions
All are non-formulary.	When used in combination with lifestyle changes, behavioral interventions and physical activity.	All are contraindicated in pregnancy.
Orlistat	Average weight loss at 1 year = 5.7 lb. Improved glycemic control, cholesterol, blood pressure. > 5% weight loss maintained up to 36 months.	<ul style="list-style-type: none"> • Unanticipated diarrhea, flatulence, oil spotting, bloating/abdominal pain/dyspepsia. • GI side effects in 16–30% patients. • Contraindicated in patients with cholestasis, chronic malabsorption syndrome. • No long-term studies available beyond 36 months.
Lorcaserin	Average weight loss at 1 year = 7.3 lb. Improved glycemic control, HDL cholesterol, blood pressure, waist circumference. > 5% weight loss maintained in second year = 67.9% versus 50.3% with placebo.	<ul style="list-style-type: none"> • Headache, URI, nausea, nasopharyngitis. • Effects on cardiovascular morbidity and mortality have not been established. • No long-term studies beyond 2 years.
Naltrexone/ bupropion	Average weight loss at 1 year = 10.8 lb. Improved glycemic control, health-related quality of life.	<ul style="list-style-type: none"> • Nausea, headache, constipation. • Contraindicated for patients with uncontrolled hypertension, seizure disorders, chronic opioid use, MAOI use within 14 days. • Effects on cardiovascular morbidity and mortality have not been established. • No long-term studies beyond 1 year.
Phentermine	Average weight loss at 2–7 months ranged from 2.4 to 19.4 lb.	<ul style="list-style-type: none"> • No long-term data on safety or efficacy. • Insomnia, irritability, agitation, anxiety, dry mouth. • Contraindicated in patients with history of CVD, MAOI use, hyperthyroidism, glaucoma, agitated states, history of drug abuse. • No long-term studies beyond 28 weeks.
Phentermine/ topiramate ER	Average weight loss at 1 year = 19.4 lb. Improved glycemic control, cholesterol, blood pressure, sleep apnea, incidence of type 2 diabetes. > 10% body weight loss maintained in second year = 54% versus 11.5% with placebo.	<ul style="list-style-type: none"> • Dry mouth, dysgeusia, paresthesia, insomnia, constipation. • Effects on cardiovascular morbidity and mortality have not been established. • Contraindicated in patients with glaucoma, hyperthyroidism, MAOI use. • No long-term studies beyond 2 years.
Liraglutide	Average weight loss at 1 year = 11.7 lb. Reduction in metabolic syndrome, type 2 diabetes. > 5% weight loss maintained = 81.4% versus 48.9% in placebo.	<ul style="list-style-type: none"> • Nausea, vomiting, diarrhea, constipation. • Serious adverse events include cholelithiasis and acute pancreatitis. • Effects on cardiovascular morbidity and mortality for weight loss have not been established. However, limited CV data does exist for use in diabetes. • No long-term studies beyond 1 year are available for weight-loss outcomes.

Screening for Obesity-Related Comorbidities

Adults

Obese patients are at high risk for diabetes, depression, and hypertension. Specific screening recommendations for diabetes and depression can be found in the Type 2 Diabetes Guideline and the Depression Guideline, respectively. Blood pressure should be checked at every clinic visit.

If adult patients are symptomatic for sleep apnea (e.g., snoring and/or witnessed apnea), assess and consider a Sleep Medicine referral if at least one of the following conditions is present:

- Unexplained, excessive daytime sleepiness, which can include falling asleep while driving; unplanned and/or uncontrolled napping; or sleepiness interfering with work or other functioning.
- Unexplained pulmonary hypertension, secondary polycythemia, or resistant hypertension.
- Cardiovascular issues (hypertension, ischemic heart disease, or cerebrovascular disease) for which OSA would be a concerning additional comorbidity.
- Patient is in a mission-critical occupation, such as bus driver, trucker, or pilot.

Children and adolescents

Children and adolescents with overweight and obesity are at increased risk for a number of comorbid conditions. There is currently insufficient evidence to recommend for or against lab screening for diabetes, fatty liver disease, and dyslipidemia for children and adolescents.

Consensus-based screening schedules typically suggest screening for comorbidities in the presence of certain risk factors, such as BMI higher than the 95th percentile; patient history of hypertension, dyslipidemia, or smoking; acanthosis on exam; or family history of type 2 diabetes, dyslipidemia, or cardiovascular disease. However, some experts suggest that these tests should be performed only if they will alter the course of treatment.

Screen overweight and obese adolescents for depression by using the Patient Health Questionnaire for Adolescents (PHQ-9A). Evidence suggests that patients with depression are less likely to be adherent to recommended management plans and less likely to be effective at self-management of chronic conditions. See the Depression Guideline for additional guidance. Patients with major depression can be treated in primary care or offered a referral to Behavioral Health for counseling and/or antidepressant therapy.

Routine screening for sleep apnea is not recommended for children and teens because evidence is lacking regarding whom to screen and the effectiveness of treatment.

Evidence Summary

The Weight Management Guideline was developed using an evidence-based process, including systematic literature search, critical appraisal, and evidence synthesis.

As part of our improvement process, the Kaiser Permanente Washington guideline team is working towards developing new clinical guidelines and updating the current guidelines every 2–3 years. To achieve this goal, we are adapting evidence-based recommendations from high-quality national and international external guidelines, if available and appropriate. The external guidelines should meet several quality standards to be considered for adaptation. They must: be developed by a multidisciplinary team with no or minimal conflicts of interest; be evidence-based; address a population that is reasonably similar to our population; and be transparent about the frequency of updates and the date the current version was completed.

In addition to identifying the recently published guidelines that meet the above standards, a literature search was conducted to identify studies relevant to the key questions that are not addressed by the external guidelines.

External guidelines meeting KPWA criteria for adaptation/adoption

- 2018 *Behavioral and Pharmacotherapy Weight Loss Interventions to Prevent Obesity-Related Morbidity and Mortality in Adults: An Updated Systematic Review for the U.S. Preventive Services Task Force. Evidence Synthesis No. 168. AHRQ Publication No. 18-05239-EF-1.* Rockville, MD: Agency for Healthcare Research and Quality; 2018. (LeBlanc 2018)
- 2017 U.S. Preventive Services Task Force. Screening for Obesity in Children and Adolescents: Recommendation Statement.
- 2017 Kaiser Permanente National. *Management of Overweight and Obesity in Adults Clinician Guide.*
- 2016 American Association of Clinical Endocrinologists and American College of Endocrinology Comprehensive Clinical Practice Guidelines for Medical Care of Patients with Obesity. (Garvey 2016)
- 2016 American Diabetes Association. Standards of Medical Care in Diabetes—2016.
- 2014 National Institute for Health and Care Excellence (NICE). *CG189. Obesity: Identification, Assessment and Management of Overweight and Obesity in Children, Young People and Adults: Partial Update of CG43.*
- 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.
- 2012 U.S. Preventive Services Task Force. Screening for and Management of Obesity in Adults: Recommendation Statement.

Children and adolescents

- 1. What is the clinical effectiveness of behavioral interventions in children and adolescents in:**
 - **Improving health outcomes?**
 - **Reducing incidence of obesity?**

A U.S. Preventive Services Task Force systematic review (USPSTF 2017) and three meta-analyses (Al-Khudairy 2017, Colquitt 2016, Mead 2017) were reviewed. The USPSTF 2017 review should be adopted.

USPTF 2017

Population characteristics included patients aged less than 18 years with BMI \geq 85th percentile; other patients included those who had \geq 80% of risk factors for overweight or obesity-related conditions. Patients were followed for at least 6 months, up to 12–24 months. Interventions had multiple components, including at least two of the following: diet, physical activity, and behavioral approaches. Control groups were offered usual care, no intervention, minimal intervention (\leq 60 minutes of direct contact), waitlist, or attention control.

The following results were reported:

- **Weight and adverse events:** Moderate evidence indicated that in children and adolescents who were overweight or obese, multicomponent lifestyle or behavioral interventions with \geq 26 contact hours were effective in reducing excess weight in the short term with no adverse events, compared to usual care, no intervention, waitlist, attention control, or minimal intervention.
- **Cardiometabolic outcomes:** The evidence also showed a reduction in systolic blood pressure, a small reduction in diastolic blood pressure, improvement in 2-hour oral glucose test, and improvement in insulin levels among interventions with more contact hours (\geq 52).
- **All-cause mortality and morbidity:** No studies reported on all-cause mortality and morbidity.
- **Outcomes based on subgroups:** Effectiveness based on age, sex, race, baseline BMI, and baseline waist circumference was not reported.

- 2. What is the clinical effectiveness of the most common bariatric surgeries (laparoscopic sleeve gastrectomy and laparoscopic Roux-en-Y gastric bypass) in children with obesity on:**
 - **Weight loss? (1 year)**
 - **Weight loss maintenance? (3 years, 5 years)**
 - **Comorbidities, including CV risk factors**
- 3. What are the short-term (30-day, 90-day, 1-year) and long-term (\geq 5-year) adverse effects of the most common bariatric procedures in children?**
 - **Death**
 - **Reoperation**

Three systematic reviews and meta-analyses (Pedroso 2018, Qi 2017, Shoar 2017) evaluating the effectiveness of the most common bariatric surgeries (Roux-en-Y gastric bypass [REYGB] and sleeve gastrectomy) were assessed. Patients included morbidly obese adolescents in most studies, with pre-operative BMI ranging from 38 to 91 kg/m²; age varied from 12 to 19 years. Most of the patients were female and patients were followed for at least 6 months.

Across the studies, REYGB and sleeve gastrectomy reduced weight, improved glycemic and lipid profiles, and comorbidity resolution in the short- and middle-terms in adolescents with morbid obesity. Likewise, mortality and reoperation were low in the middle-term. However, the evidence from these studies was low. Longer-term and higher-quality studies are needed.

Adults

4. What is the clinical effectiveness of diets in adults who are overweight or obese (BMI ≥ 30 kg/m²) in reducing or maintaining weight loss?

A number of systematic reviews and meta-analyses were identified. Low to moderate evidence indicates that each of the diet interventions below might be effective in overweight and obese patients in the short term. Longer-term studies are warranted.

Low-carbohydrate diets

Two meta-analyses (Hashimoto 2016, Mansoor 2016) were reviewed. These studies provide low to moderate evidence to support the use of low-carbohydrate diets over control diets in the short term to reduce weight and fat mass in overweight and obese patients. However, low-carbohydrate diets led to higher LDL cholesterol, and no differences were found for total cholesterol, systolic BP, and diastolic BP between low-carbohydrate diets and low-fat diets. In addition, while very low-carbohydrate diets were more effective than control, no difference was found between medium-carbohydrate diets and control. Compared to low-fat diets, results were not consistent in the short term.

Low-fat diets

Moderate evidence from one meta-analysis (Tobias 2015) did not support low-fat diet interventions over low-carbohydrate diets or higher-fat diets interventions in the long term (≥ 1 year). However, low-fat diets may be more effective than usual diets (follow-up ≥ 1 year).

Vegetarian diets

Low evidence from two meta-analyses (Dinu 2017, Barnard 2015) showed significant reduction of BMI, total cholesterol, LDL cholesterol, and glucose levels in vegetarians and vegans.

Low and high glycemic index/load diets

Low evidence indicates no difference between low and high glycemic load on body weight, BMI, z-score of BMI, fat mass, fat-free mass, height, waist circumference, hip circumference, waist-to-hip ratio, total cholesterol, LDL cholesterol, HDL cholesterol, diastolic and systolic blood pressure, fasting serum glucose, fasting serum insulin, HBA1c, and C-reactive protein.

Very-low-energy diets (VLEDs)

Two systematic reviews and meta-analyses were reviewed. These studies (Parretti 2016, Rehackova 2016) assessed VLEDs in obese patients without or with comorbidities, including type 2 diabetes. The evidence was limited in one study, whereas in the second study low evidence showed that VLEDs were not effective unless combined with behavioral interventions (short-term at 12 months).

Mediterranean diet

Three studies that did not change the evidence statement of the ACC/AHA/TOS 2013 guideline were reviewed. The studies reported that Mediterranean diet reduced weight and resulted in cardiovascular benefits comparable to low-fat diets.

5. **What is the long-term clinical effectiveness of the most common bariatric surgeries (laparoscopic sleeve gastrectomy, laparoscopic Roux-en-Y gastric bypass) in adults with obesity on:**

- **Weight loss?**
- **Weight loss maintenance?**
- **Comorbidities?**
- **Mortality?**

Does effectiveness vary across BMI?

6. **What are the short-term (30-day, 90-day, 1-year) and long-term (≥ 5-year) adverse effects of the most common bariatric procedures in adults?**

- **Death**
- **Reoperation**

Weight loss

Six studies were reviewed: three randomized controlled trials (RCTs) (Ikramuddin 2016, Mingrone 2015, Schauer 2017) and three observational cohort studies (Adams 2017, Courcoulas 2017, Øvrebø 2017). The studies were assessed as moderate evidence. RYGB or sleeve gastrectomy are more effective in reducing weight than non-surgery intervention in severe obesity in the long term.

Weight loss maintenance

Three studies were reviewed. Two were RCTs (Mingrone 2015, Schauer 2017), and one was a cohort study (Courcoulas 2017). The studies resulted in moderate evidence suggesting that RYGB or sleeve gastrectomy may be more effective in maintaining weight loss with variations than medical treatment over the moderate to long term.

Comorbidities

Diabetes remission: Four RCTs (Schauer 2017, Ikramuddin, 2016, Mingrone 2015, Courcoulas 2014) and four observational studies (Nedelcu 2017, Courcoulas 2017, Øvrebø 2017, Jakobsen 2018) were reviewed. Patients with moderate and severe obesity were included, and follow-up was up to 7 years. Low to moderate evidence suggests that RYGB or sleeve gastrectomy can improve diabetes remission and that the procedures are more effective than medical treatment or lifestyle interventions among adults with moderate to severe obesity in the long term.

Hypertension remission: Three observational studies (Nedelcu, 2017, Øvrebø 2017, Jakobsen 2018) were reviewed. The studies provided low evidence suggesting that RYGB or sleeve gastrectomy may resolve hypertension over the long term, and that the procedures may be more effective than medical or lifestyle interventions among patients with severe obesity.

Dyslipidemia remission: Four observational studies and two RCTs were reviewed. The studies provided low to moderate evidence suggesting that RYGB or sleeve gastrectomy are more effective than medical treatment or lifestyle interventions in dyslipidemia remission on the long-term (up to 7 years).

Quality of life: Three RCTs (Schauer 2017, Mingrone 2015, Schauer 2014) with moderate risk of bias were identified. The studies provided moderate evidence suggesting significantly better quality of life in the RYGB or sleeve gastrectomy group than in the medical treatment group at 3 and 5 years of follow-up.

Mortality

Three studies were reviewed and included one RCT and two observational studies. Patients were severely obese and follow-up was up to 10 years. The studies provided low evidence suggesting that RYGB or sleeve gastrectomy were associated with lower mortality over the long term.

Two RCTs (Schauer 2017, Mingrone 2015) and two observational studies were reviewed. Patients had moderate to severe obesity. The studies provided low evidence suggesting lower mortality and reoperation with RYGB and sleeve gastrectomy over a maximum of 7 years of follow-up.

7. Does clinical effectiveness of bariatric surgery differ for diabetes outcomes (remission, relapse, HbA1c control) across BMI?

The American Diabetes Association 2016 indicated that there is insufficient evidence to recommend bariatric surgery for individuals with BMI ≤ 35 kg/m² and type 2 diabetes outside of a research protocol. Bariatric surgery may be considered for adults with type 2 diabetes whose BMI is > 35 kg/m² (diabetes or associated comorbidities are difficult to control with lifestyle and pharmacologic therapy; lifelong support and monitoring are necessary).

A cohort study (Arterburn 2015) reported that super obese (BMI ≥ 50 kg/m²) as well as less obese (BMI < 50 kg/m²) were associated with lower mortality at 14 years. However, no significant interactions were reported between super obesity and treatment.

8. Does clinical effectiveness differ for diabetes outcomes (remission, relapse, HbA1c control) across bariatric surgeries?

Four RCTs (Salminen 2018, Peterli 2018, Yang 2015, Peterli 2017) with head-to-head comparisons were reviewed. The studies included adults with morbid obesity, except one study that included only patients with BMI ≥ 28 and ≤ 35 kg/m². Patients were followed for up to 5 years after the procedures. These studies had low risk of bias and resulted in high evidence, suggesting that in morbidly obese patients, RYGB or sleeve gastrectomy resulted in remission of diabetes and control of glycemic profiles (HbA1C or FPG) but no significant difference was reported between the procedures.

9. Are there known predictors of better diabetes outcomes after bariatric surgery?

Four studies were reviewed (Ikramuddin 2016, Nedelcu 2017, Adams 2017, Hatoum 2016). Predictors of type 2 diabetes remission varied across studies. The studies had high to moderate risk of bias but there were issues with consistency. The evidence from the studies was considered low. However, the significant predictors of HbA1C reported were C-peptide (from moderate-quality RCT), baseline medication status, waist circumference, duration of type 2 diabetes, and pre-operative BMI in kg/m², age, and preoperative insulin use.

10. What is the clinical effectiveness of pharmacologic treatment (orlistat, lorcaserin, naltrexone/bupropion, phentermine/topiramate extended release, liraglutide) in adults who are overweight or obese in:

- Reducing weight? (1 year)
- Weight maintenance? (3 years, 5 years)
- Obesity-related morbidity?

11. What are the adverse events of pharmacologic treatment (orlistat, lorcaserin, naltrexone/bupropion, phentermine, phentermine/topiramate extended release, liraglutide) for weight loss?

Kaiser Permanente National systematic review and AHRQ Publication No. 18-05239-EF-1 (Evidence synthesis No. 168) were reviewed.

KP National

Medications included orlistat, lorcaserin, naltrexone/bupropion, phentermine/topiramate extended release, and liraglutide. Comparisons were made between the medications and placebo or lifestyle intervention including physical activity, diet, and behavior modification. Moderate evidence suggests that pharmacologic treatment may reduce weight, maintain weight loss, resolve obesity-related comorbidities (type 2 diabetes, HbA1C, LDL, HDL, FPG, and hypertension) over a short-term period (1–2 years). Adverse events varied and the risk of withdrawal due to adverse events was high.

AHRQ Publication No. 18-05239-EF-1

Pharmacologic treatment led to better outcomes than placebo in the short term. However, the risk of harms was higher and longer-term studies were scarce. For longer-term health outcomes, evidence related to CVD was rare and no definite conclusions could be drawn.

12. What is the clinical effectiveness and safety of comprehensive lifestyle interventions (diet, physical activity, behavior) in reducing weight or maintaining weight loss in adults?

13. What format of comprehensive lifestyle interventions delivery is effective in reducing weight or maintaining weight loss (online, group session, individual session, email, telephone)?

AHRQ Publication No. 18-05239-EF-1 (Evidence synthesis No. 168) was the source of the review. The review assessed behavior interventions in adult patients with obesity and reported that patients undergoing behavior-based interventions had greater weight loss than usual care over 12–18 months. In addition, patients in behavior-based intervention groups had greater (near twice) odd of losing 5% of their initial weight compared to usual care over the same period. Weight regain was reported in both groups but patients in behavior-based groups regained less weight than controls. Weight loss maintenance was also higher in intervention groups in studies with 36 months follow-up. No serious adverse events were found and no differences were found between the groups. This systematic review and meta-analysis met all the criteria of AMSTAR (**A** **M**ea**S**urement **T**ool to **A**ssess systematic **R**eviews); this suggests a high-quality systematic review and its conclusions should be adopted.

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Guideline Development Process and Team

Development process

To develop the Weight Management Guideline, the guideline team reviewed evidence in the following areas: The guideline team also adapted some recommendations from externally developed evidence-based guidelines.

This edition of the guideline was approved for publication by the Guideline Oversight Group in August 2018.

Team

The Weight Management Guideline development team included representatives from the following specialties: Adolescent medicine, bariatric surgery, family medicine, nursing, pediatrics, pharmacy, and primary care.

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Disclosure of conflict of interest

Kaiser Permanente requires that team members participating on a guideline team disclose and resolve all potential conflicts of interest that arise from financial relationships between a guideline team member or guideline team member's spouse or partner and any commercial interests or proprietary entity that provides or produces health care-related products and/or services relevant to the content of the guideline. Team members listed above have disclosed that their participation on the Weight Management Guideline team includes no promotion of any commercial products or services, and that they have no relationships with commercial entities to report.