Identification, Evaluation, and Treatment of Overweight and Obesity in Adults
Clinical Practice Guidelines
MedStar Health

These guidelines are provided to assist physicians and other clinicians in making decisions regarding the care of their patients. They are not a substitute for individual judgment brought to each clinical situation by the patient's primary care provider in collaboration with the patient. As with all clinical reference resources, they reflect the best understanding of the science of medicine at the time of publication but should be used with the clear understanding that continued research may result in new knowledge and recommendations.

Introduction

Obesity is a chronic, relapsing and disabling condition that affects every age, race, gender, and ethnicity. It is a multimodal and dynamic disease that can cause adverse psychosocial health consequences contributing to the increasing economic burden[1]. Obesity is a major risk factor for multiple co-morbid chronic illnesses. These include hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, fatty liver disease, gallbladder disease, osteoarthritis, sleep apnea, respiratory problems, and cancers.[1] Among cancers, the most important ones are the endometrial, breast, prostate, and colon. Higher body weight is also associated with an increase in all-cause mortality. This guideline aims to provide useful advice on how to screen for obesity and information on simple principles that can help with weight reduction and maintenance.

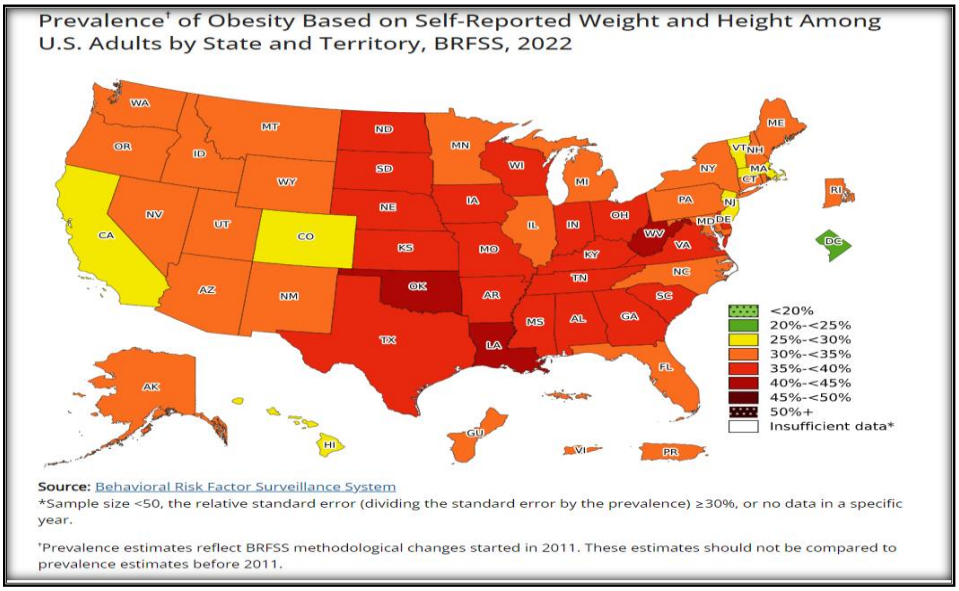
The United States Preventative Service Task Force (USPSTF) recommends that clinicians should offer intense multicomponent behavioral intervention to adults with a BMI of 30 or higher. Such patients can also be referred to an intense multimodal behavioral program if one is not available by the prescribing physician.[2] **Obesity is an ongoing medical condition; both the patient and the practitioner need to understand that successful treatment requires a life-long effort**. These guidelines do not cover children and pregnant females.

Prevalence

The National Health and Nutrition Examination Survey (NHANES), and the Behavioral Risk Factor Surveillance System (BRFSS) contribute to the prevalence of obesity based on self-reported demographics including height and weight.
The prevalence of obesity varies by demographic group, with non-Hispanic black adults being affected disproportionately.
The latest data published by BRFSS in 2022 provides further in-depth analysis as indicated below[4]:

- The prevalence of obesity was greater than 20% in all states and territories in the United States, which is 1 in 5 adults.
- It was lowest in adults aged 18 to 24 years (20.5%) compared to adults between 45-54 years of age, with the highest prevalence at 39.9 %.
- The prevalence of obesity in descending order is highest in the Midwest (35.8%) and South (35.6%), followed by the Northeast (30.5%) and the West (29.5%).
- The prevalence rate of obesity in The District of Columbia is between 20% and < 25%.
- It was inversely proportional to the level of education, ranging between 37.6% with a high school diploma or equivalent to 27.2% if they have a college degree.
- The prevalence of obesity was higher among non-Hispanic black adults in 38 states based on the data reviewed from 48 states and District of Columbia.
- In the District of Columbia, the self-reported prevalence rate of obesity is 24.4%, while that in Maryland is 33.2% and in Virginia is 35.2%

Figure 1: Prevalence of Self- Reported Obesity Among U.S Adults by State and Territory, BRFSS, 2022[4]



Identification of Obesity

Some of the simplest ways to assess the burden of adiposity include using anthropometric measures. This includes Body Mass Index (BMI), waist circumference, and waist to hip ratio. Body composition analysis can be performed by using simple measures like skinfold calipers and waist circumference measurements. More sophisticated methods include Dual-Energy X-ray Absorptiometry (DXA), Hydrostatic Weighing, Air Displacement Plethysmography (Bod Pod), Bioelectrical Impedance Analysis (BIA), Bioimpedance Spectroscopy (BIS), multi compartment models (MCM), 3D body scanners, and electrical impedance myography (EIM).

The Skinfold thickness using various calipers is less reproducible but can be used to establish a baseline and track progress by the same user using the same equipment over time. The underutilized, widely available, and effective methods include the assessment of body composition using a bioelectrical impedance scale, DXA scan and MRI. We will focus on simple methods for screening including BMI and Waist circumference. They can be easily performed in the outpatient setting and are reproducible.

Body Mass Index: The BMI, which describes relative weight for height, should be used to assess overweight and obesity and to monitor changes in body weight. Measurements of body weight alone can be used to determine the efficacy of weight loss therapy. BMI is calculated as weight (kg)/height squared (m^2). Weight classifications by BMI, selected for use in this report, are shown in the table below (Table-1)

Table-1: International Classification of Underweight, Overweight, and Obesity according to BMI

Classification	BMI(kg/m^2)	
	Principal cut-off points	Additional cut-off points
Underweight	**<18.50**	**<18.50**
Severe thinness	<16.00	<16.00
Moderate thinness	16.00 - 16.99	16.00 - 16.99
Mild thinness	17.00 - 18.49	17.00 - 18.49
Normal range	**18.50 - 24.99**	**18.50 - 22.99**
		23.00 - 24.99
Overweight	**≥25.00**	**≥25.00**
Pre-obese	25.00 - 29.99	25.00 - 27.49
		27.50 - 29.99
Obese	**≥30.00**	**≥30.00**
Obese class I	30.00 - 34.99	30.00 - 32.49
		32.50 - 34.99
Obese class II	35.00 - 39.99	35.00 - 37.49
		37.50 - 39.99
Obese class III	≥40.00	≥40.00

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.

The risk of developing diabetes and cardiovascular disease occurs at a lower BMI in Asian populations. The BMI cutoff for "increased risk" in this population is between 22-25 kg/m^2 and that for the "high risk" is from 26-31 kg/m^2. Nevertheless, the WHO recommends that the current classification be retained as the official international classification while encouraging all countries to report data using the additional cut-off BMI ranges to facilitate international comparisons. Pregnant women who were classified as having obesity based on their pre-pregnant weight, may encounter certain obstetrical risks. However, active weight loss measures with medications and severe caloric restriction have been discouraged during the pregnancy.

Waist Circumference: The presence of excess fat in the abdomen out of proportion to total body fat is an independent predictor of risk factors and morbidity. Waist circumference is positively correlated with abdominal fat content. It provides a clinically acceptable measurement for

assessing a patient's abdominal fat content before and during weight loss treatment. The waist circumference may also vary by race and ethnicity.

Table 2: Waist circumference

High Risk
Men: >102 cm (>40 in.)
Women: >88 cm (>35 in.)

Assessment of Risk Status

1.Risk assessment by anthropometric measures: The patient's risk status should be assessed by determining the degree of overweight or obesity based on BMI, the presence of abdominal obesity based on waist circumference, and the presence of concomitant CHD risk factors or comorbidities.

The table (3) below defines relative risk categories according to BMI and waist circumference. It is important to note that these categories denote relative risk, not absolute risk. They relate to the need to institute weight loss therapy, and do not explicitly define the required intensity of risk factor modification. The latter is determined by estimation of absolute risk based on the presence of associated disease or risk factors.

Table-3: Classification by using BMI, Waist Circumference and Associated Disease Risk*

	BMI (kg/m^2)	**Obesity Class**	**Men 102 cm (40 in.) Women 88 (35 in.)**	**Men >102 cm (>40 in.) Women >88 cm (>35 in.)**
Underweight	<18.5			
Normal+	18.5-24.9			
Overweight	25.0-29.9		Increases	High
Obesity	30.0 - 34.9	I	High	Very High
	35.0-39.9	II	Very High	Very High
Extreme Obesity	40	III	Extremely High	Extremely High

***** Disease risk for type 2 diabetes, hypertension, and CHD.
* Disease Risk Related to Normal Weight and Waist Circumference
+ Increased waist circumference can also be a marker for obesity/ overweight even in persons with normal weight.

Identification of Patients at Very High Absolute Risk:
The following disease conditions or target organ damage in hypertensive patients denotes the presence of remarkably high absolute risk that triggers the need for intense risk factor modification as well as disease management. For example, the presence of very high absolute risk indicates the need for aggressive cholesterol-lowering therapy.

a. Established coronary heart disease (CHD)

- History of myocardial infarction
- History of angina pectoris (stable or unstable)
- History of coronary artery procedures (angioplasty) or surgery

b. Presence of other atherosclerotic diseases

- Peripheral arterial disease
- Abdominal aortic aneurysm
- Symptomatic carotid artery disease
- Type 2 diabetes
- Obstructive sleep apnea

c. Identification of other obesity-associated diseases:

- Patients with obesity are at increased risk for several conditions that require detection and appropriate management. These conditions generally do not lead to widespread or life-threatening consequences; however, they can be mentally disabling and can affect the patient's self-esteem. Some of these conditions include:
- Gynecological abnormalities (example Fibroids, PCOS)
- Osteoarthritis
- Gallstones and their complications
- Stress incontinence.

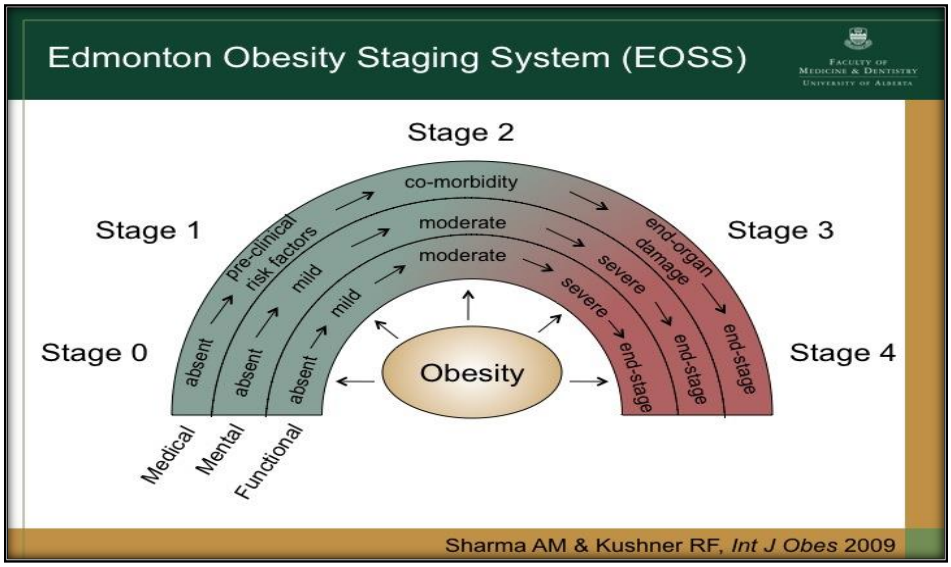
d. Identification of Cardiovascular Risk Factors That Impart a High Absolute Risk:
Patients can be classified as being at high absolute risk for obesity-related disorders if they have three or more of the multiple risk factors listed below. The presence of high absolute risk corelates with the intensity of cholesterol lowering therapy and blood pressure management.

- Cigarette Smoking
- High LDL, low HDL
- Family history of premature CHD
- Impaired fasting glucose.
- Hypertension
- Age: Male 45 years and female 55 years and older.

2. The Edmonton Obesity Staging System (EOSS): Obesity can also be classified into five stages based on the Edmonton Obesity Staging System (EOSS). This is a classification that considers the associated disease burden causing adverse metabolic and psychological outcomes. This staging system can be used to individualize treatment options for patients suffering from obesity.

If the patient is in stage 0 or I lifestyle interventions including dietary modifications and increasing physical activity can be used. The management of stage II and III involves initiating further behavioral strategies and consideration of pharmacologic and surgical interventions. EOSS staging system should not be used once clinical weight loss treatment has been initiated.[5,6,7]

Figure 2: Edmonton Obesity Staging System (EOSS) [5]



Lifestyle assessment using the Pillars of Obesity

1. Assessment of Dietary habits:

Dietary history will include inquiries about previous lowest and highest weights, weight loss efforts, reasons for weight gain, and results of previous weight loss attempts (if any). Discuss what they think is responsible for their current weight gain, investigate the quality and the quantity of food consumed. This is the time to investigate barriers to resources, the concept of food journaling, exploring options and addressing concerns.

2. Assessment of Physical inactivity:

A lack of physical activity imparts an increased risk for both CVD and type 2 diabetes. Physical inactivity enhances the severity of other risk factors, but it also has been shown to be an "independent" risk factor for all-cause mortality or CVD mortality.

When obtaining physical activity history, focus on identifying enjoyable and achievable physical activity targets. Inquire about their leisure time activities and previous experiences. This is an opportunity to access baseline exercise capacity and explore any limitations to a given physical activity program. This will include musculoskeletal injuries, breathing issues or other associated comorbidities.

3. Assessment of Medication Use:

This will include a review of the current medication list, over the counter and herbal supplements. Information about previous weight loss medications, response, or intolerance. Table 4 has a list of some of the weight positive medications and alternative options.

Table 4: Medications associated with weight gain (UpToDate)

Medications associated with weight gain and alternatives

Category	Drug class	Weight gain	Alternatives
Psychiatric agents	Antipsychotic	Clozapine, risperidone, olanzapine, quetiapine, haloperidol, perphenazine	Ziprasidone, aripiprazole
	Antidepressants/mood stabilizers: tricyclic antidepressants	Amytriptyline, doxepin, imipramine, nortriptyline, trimipramine, mirtazapine	Bupropion*, nefazodone, fluoxetine (short term), sertraline (<1 year)
	Antidepressants/mood stabilizers: SSRIs	Fluoxetine¶, sertraline¶, paroxetine, fluvoxamine	
	Antidepressants/mood stabilizers: MAOIs	Phenylzine, tranylcypromine	
	Lithium	–	
Neurologic agents	Antiseizure medications	Carbamazepine, gabapentin, valproate	Lamotrigine¶, topiramate*, zonisamide*
Endocrinologic agents	Diabetes drugs	Insulin (weight gain differs with type and regimen used), sulfonylureas, thiazolidinediones, sitagliptin¶, metiglinide	Metformin*, acarbose*, miglitol*, pramlintide*, edenatide*, liraglutide*
Gynecologic agents	Oral contraceptives	Progestational steroids, hormonal contraceptives containing progestational steroids	Barrier methods, IUDs
	Endometriosis treatment	Depot leuprolide acetate	Surgical methods
Cardiologic agents	Antihypertensives	alpha-blocker¶, beta-blocker¶	ACE inhibitors¶, calcium channel blockers¶, angiotensin-2 receptor antagonists
Infectious disease agents	Antiretroviral therapy	Protease inhibitors	–
General	Steroid hormones	Corticosteroids, progestational steroids	NSAIDs
	Antihistamines/anticholinergics	Diphenhydramine¶, doxepin¶, cyproheptadine¶	Decongestants, steroid inhalers

* Weight-neutral or promotes weight loss.

¶ The data supporting the effects of these medications on weight gain are low quality or conflicting.

Information from: Apovian CM, Aronne LJ, Bessesen DH, et al. Pharmacological management of obesity: An Endocrine Society clinical practice guideline. J Clin Endocrinol Metab 2015; 100:342.

UpToDate

4. Assessment of Patient Motivation and Behavioral Health:

Practitioners need to assess their patient's motivation to enter weight loss therapy and assess their readiness to change. The transtheoretical model for change can be used for this reason. This includes an assessment of the stages of change or readiness. It evolves from an initial phase of "Precontemplation" to a steadier "Maintenance phase". Explore social support options, inquire about weight bias and stigma associated with weight gain. Utilize this opportunity to screen for depression, anxiety, eating disorders, night eating syndrome, and Mood disorders.

5. Assessment of Bariatric surgery status:

This is an opportunity to identify if the patient had bariatric surgery. If they do, inquire about the type of the procedure, the amount of weight loss after the procedure, and regain if any. If they did not have one, gauge their level of interest if recommended.

Weight Loss Goals

The general goals of weight loss and management are:

- To identify the main "drive" behind the weight loss journey.
- To reduce body weight in a goal-oriented manner
- To maintain a long-term healthy body weight after achieving the weight loss goal.
- To learn and implement healthy lifestyle interventions to prevent further weight gain.

SMART Goals:

Setting up SMART goals allows for a more personalized and patient-oriented approach.

- **S:** *S*pecific weight loss goals. Set up long term and short-term goals.
- **M**: Measurable; food log, pedometer, or an app for steps, weighing once weekly.
- **A:** Achievable; an example would be 1lb/week.
- **R:** Realistic goals; example is 5-10% of the current body weight.[1]
- **T:** Time bound; review goals every in 3-6 months with close follow-ups

Target Levels for Weight Loss:

The initial target goal is to decrease body weight by about 10 percent. If this target is achieved, consideration can be given to setting up further weight loss goals. It is important for patients to realize that even modest weight loss of 3-5%, if sustained, can result in clinically meaningful reduction in risk of diabetes as well as control of existing diabetes and hypertriglyceridemia.

Rate of Weight Loss:
A reasonable timeline to achieve 5-10% weight loss is over 3-6 months with intensive lifestyle intervention.[1]

Knowing the **Total Energy Expenditure (TEE)** at a given age and gender is the most important initial step in determining the required total daily caloric consumption. It has three essential components including **Basal energy expenditure (BEE)** also known as Basal Metabolic Rate (BMR) or Resting Metabolic Rate (RMR) which is 40-75% of TEE, **Physical activity energy expenditure (PAEE)** which is about 30% of TEE and the **Thermic effect of food (TEF)** which is the energy obtained when consuming food and is approximately 10% of the TEE. The thermic effect of food cannot be changed much.[8]

- Equations like the Henson Benedict equation or Mifflin St Jeor equation can be used to calculate the BEE (RMR or BMR), which estimates the calories burned at rest over 24 hrs.
- The BEE (RMR or BMR) should be multiplied by the activity factor. This will result in an estimated Total Energy Expenditure (TEE) for that age and gender. NIH makes it simple by identifying physical activity levels from 1.4 (sedentary) to 2.5 (highly active). A value of 1.6 can be used for light activity at school or work (mostly sitting) and moderate physical activity (such as walking or cycling) at least once a week (NIH).[9] This calculation will provide an estimate of total caloric intake when maintaining the current weight.
- Creating a negative caloric deficit of 500 kcal/d from the calculated TEE (above) can result in about 1 lb./week of weight loss. 1-2 lb./week of weight loss is more sustainable in the long run[10].

After about 7-8 months of therapy, the rate of weight loss usually begins to stall. This is mostly due to the reduction in overall total energy expenditure. At this point, an effort can be made to maintain the weight loss achieved. If additional weight loss is desired or if the goal was not achieved, the current plan should be reviewed and further adjustments considered, including adding an anti-obesity medication.

Prevention of Further Weight Gain:
Some patients may not be able to achieve significant weight reduction. In such patients, an important goal is to prevent further weight gain that would exacerbate disease risk. Some of the strategies could be trying partial meal replacements, eliminating weight positive medications, revisiting the weight loss therapy on every visit, and motivational interviewing.

Treatment for Weight Loss and Weight Maintenance

5A's Framework: *Consider using "5A's Framework for Obesity" when performing an assessment and formulating a treatment plan.*

Ask: Seek permission from the patient when discussing their weight.
Assess: Explore any associated comorbidities, reasons for weight gain, the stage and class of obesity, review records, and request appropriate investigations.
Advise: Discussion about realistic, reasonable, and achievable long and short-term weight loss goals.
Agree: Agreement on goals including nutritional therapy, exercise prescription and medication management.
Assist: Arrange appropriate close follow-ups, preferably monthly, provide appropriate resources including referrals to behavioral therapy (if required), physical therapy (if required) and various handouts that could be helpful to the patient and their weight loss journey.

a. Dietary Therapy:

- Maintaining an energy deficit of about 500- 750 kcal/day is indicated[1]. This could be obtained by a calorie prescription of 1200-1500 kcal per day for females and 1500-1800 kcal per day for males[1]. There are multiple dietary options including DASH diet, Mediterranean diet, plant-based diet, low-fat and low carbohydrate diets.
- No dietary prescription is better than the other, and the decision should be based on the patient's metabolic profile, preference, and adherence patteren.[11] Patients are most likely to adhere when they find a diet palatable, affordable, and sustainable.

b. Physical Activity:

- Total Energy Expenditure (TEE) can be increased by physical activity through exercise and by Non-Exercise Activity Thermogenesis (NEAT) which includes household chores and leisure time activities. Physical activity is primarily helpful in maintaining a desirable weight once it has been achieved. In addition, sustained physical activity reduces overall CHD risk beyond that produced by weight reduction alone.
- Patients suffering from very severe Obesity may need to start with simple activities that can gradually be intensified. The practitioner must decide whether exercise testing for cardiopulmonary disease is needed before embarking on a new physical activity regimen. This decision should be based on a patient's age, symptoms, and concomitant risk factors. Initial activities may be walking at a slow pace, water aerobics or chair yoga. A referral to physical therapy for associated musculoskeletal problems may be immensely helpful. With time, depending on progress, the amount of weight lost, and functional capacity, the patient may engage in more strenuous activities.
- Before considering any high-intensity aerobic exercise, the risk of orthopedic injury and the availability of a safe environment should be assessed. Competitive sports, such as tennis, basketball, and volleyball can provide an enjoyable form of physical activity, however, care must be taken to avoid injury, especially in the geriatric population and those with established musculoskeletal problems. The same principle will apply when recommending other activities like jogging, cycling, rowing, cross-country skiing, aerobic dancing, and rope jumping.

Most comprehensive lifestyle programs recommend increased physical activity for 150 minutes per week which could be accomplished by brisk walking for over 30 minutes on most days of the week. A more vigorous prescription is maintaining 200 to 300 minutes per week of physical activity as recommended for weight maintenance or prevention of weight regain over a year.[1]

c. Behavior therapy and eating disorders:

The goal of behavior therapy is to modify the eating and activity habits of a patient with Obesity. Positive reinforcement strategies can be used to encourage changes in diet and physical activity. Multi-component behavioral intervention programs with at least 12 sessions/year have been shown to be more effective than programs with fewer sessions or lower treatment intensity. Unless a patient acquires a new set of eating and physical activity habits, long-term weight reduction is unlikely to succeed. The acquisition of new habits is particularly important for long-term weight maintenance at a lower weight. Most patients return to baseline weights in the absence of continued intervention.[12]

- *Self-monitoring of both eating habits and physical activity*—Objectifying one's own behavior through observation and recording is a key step in behavior therapy. Patients should be taught to record the amount and types of food they eat, the caloric values, and nutrient composition. Keeping a record of the frequency, intensity, and type of physical activity likewise will add insight to personal behavior.
- *Stress management*—Stress can trigger dysfunctional eating patterns, and stress management can defuse situations leading to overeating. Coping strategies, meditation, and relaxation techniques all have been successfully employed to reduce stress. In addition, inadequate sleep has been associated with the risk of obesity though causality has not been proven.
- *Stimulus control*—Identifying stimuli that may encourage incidental eating enables individuals to limit their exposure to high-risk situations. Examples of stimulus control strategies include learning to shop carefully for healthy foods, keeping high-calorie foods out of the house, limiting the times and places of eating, and consciously avoiding situations in which overeating occurs.
- *Problem solving*—Self-corrections of problem areas related to eating and physical activity. Approaches to problem solving include identifying weight-related problems, generating or brainstorming workable solutions and choosing one, planning and implementing the healthier alternative, and evaluating the outcome of changes in behavior.
- *Contingency management*—Behavior can be changed by use of rewards for specific actions, such as increasing time spent walking or reducing consumption of specific foods. Rewards can come from either the professional team or from the patients themselves. For example, self-rewards can be monetary or social and should be encouraged.

- *Cognitive restructuring*—Unrealistic goals and inaccurate beliefs about weight loss and body image need to be modified to help change self-defeating thoughts and feelings that undermine weight loss efforts. Rational responses designed to replace negative thoughts are encouraged.
- *Social support*—A robust system of social support can facilitate weight reduction. Family members, friends, or colleagues can assist an individual in maintaining motivation and providing positive reinforcement.
- *Screening for eating disorders*—This includes binge eating disorder, night eating syndrome, and bulimia nervosa. If there is a suspicion of an eating disorder, patients should be referred to a Behavioral therapist who specializes in these conditions. Behavioral approaches to BED associated with obesity have been derived from cognitive behavior therapy (CBT) used to treat bulimia nervosa.
- *Binge Eating Disorder (BED)*—Questionnaires like Binge disorder questionnaire (BED-7) can be used to screen these patients. BED is characterized by consuming inappropriately large portions of food, followed by an extreme feeling of fullness and guilt. Pharmacotherapy with Lisdexamfetamine, SSRI or topiramate is helpful in treating patients with obesity and BED along with CBD.[12]
  - *Night eating syndrome (NES)* — It can be found in up to 5% of the US population. It is characterized by nighttime cravings for carbohydrate-rich food with consumption of 25-50% of daily caloric intake after the evening meal and having minimal to no memory of these events. SSRI or Topiramate along with cognitive behavior therapy (CBT) can be used to treat these patients.[12]
  - *Bulimia Nervosa (BS)* — It can be observed in up to 10% college aged females. It is characterized by cycles of excessive eating, followed by compensatory measures to maintain weight. These may include excessive fasting, laxative abuse, overuse of diuretics, and vigorous exercise. Fluoxetine (FDA approved) and topiramate and Naltrexone (non-FDA approved) medications with CBD can be used to treat these patients.[12]

d. Pharmacotherapy:

Pharmacotherapy is recommended for individuals with a BMI >30 kg/m2 or a waist circumference >35 inches (women) or 40 inches (men) and for patients with a BMI >27 kg/m2 with the presence of an additional comorbid condition or more than one risk factor for 'weight-related' disease such as hypercholesterolemia, diabetes, hypertension.[12,13.]

Medications are to be used with lifestyle modification (i.e., dietary interventions, behavioral therapy, and increased physical activity). Selection of any Anti-Obesity Medications (AOM) depends upon the patient's willingness to comply, its availability, affordability, likelihood of abuse or diversion, the presence of underlying comorbid conditions, contraindications, and insurance coverage.

Any given anti-obesity medication should be tried for 12-16 weeks with the aim of losing 3-5% of body weight. This is usually planned as a short-term weight loss goal. If this desired weight loss goal is not achieved, the medication should be discontinued. The 16-week duration is usually for the medications that need titration.[12,13.]

Usually, after 7 months of therapy, the weight may "stall or plateau", this is followed by weight regain.[1] Combination therapy can be useful at this time. Such a situation needs further intervention by revisiting the weight loss plan in its totality. Reasons for lack of compliance or discontinuation of the weight loss therapy should be addressed including serious adverse effects, intolerance, or pregnancy. Intervention for weight maintenance over a year requires frequent monitoring of weight (preferably once/week), frequent visits with the provider (preferably once/month), and maintenance of physical activity over 200 mins/week.[1] Many herbal preparations are available over the counter, but their use is highly discouraged. *Anti-obesity medications are contraindicated in pregnancy.*

Table 5: Anti-Obesity Medications for short term use (up to three months)

Diethylpropion Schedule C-IV $94/month (IR) $180/month (ER)	Sympatho-mimetic (noradrenergic)	Immediate Release: 25 mg three or four times daily, taken one hour before meals, and mid-evening. Controlled release: 75 mg once daily, mid-morning Do not crush	Tachyarrhythmia, palpitations, hypertension insomnia, dry mouth, urticaria, and nausea	Indicated for short-term use (few weeks) because tolerance develops, effectiveness decreases, and the risk of dependence and abuse increases. Contraindications: Severe HTN, severe arteriosclerosis, hyperthyroidism, glaucoma, agitated states, history of drug abuse. Precautions/Warnings: Pulmonary HTN, valvular heart disease, heart failure, diabetes (reducing insulin requirements), seizures (increased risk), and concurrent use with CNS depressants.

				Drug interactions: During or within 14 days following MAOIs For a planned surgery (refer to updated Medstar preoperative guidelines)
Phentermine (Adipex-P®, Lomaira®) Schedule C-IV $47/month	Sympatho-mimetic (nonadrenergic)	Lomaira Tablet: 8mg 3x/day 30 minutes before meals Orally disintegrating tablet: 15-30mg every morning All other tablets/ capsules:15-37.5mg daily before breakfast or 1-2 hours after breakfast (Capsule only 2 hrs. after breakfast) Do not take doses in evening or later in day as may cause insomnia	(Same as above)	(Same as above) For a planned surgery (refer to updated Medstar preoperative guidelines)
Benzphetamine Schedule C-III $113/month	Sympatho-mimetic (nonadrenergic)	Initial 25 mg once daily; may titrate up to 25-50 mg three times daily.	(Same as above)	(Same as above) Maximum duration 12 weeks (about 3 months)

		Give single daily dose in the midmorning/ mid afternoon		
Phendimetrazine Schedule C-III IR $30/month SR $105/month	Sympatho-mimetic (nonadrenergic)	Immediate release: 17.5-35 mg two to three times daily, one hour before meals; max dose 70 mg three times daily. Sustained release: 105 mg daily 30-60 minutes before morning meal	(Same as above)	(Same as above)

Table 6: Anti-Obesity Medications for long term use (3 months or more)

Medication	Action	Dose	Adverse Effects	Comments
Orlistat (Xenical® Rx, Alli - OTC®) Alli (brand only): $53 Xenical (brand only): $823	Lipase inhibitor-reduces nutrient absorption.	Xenical-120mg 3 times/day with or within 1 hour after fat containing meals, plus a daily multivitamin (spaced at least two hours from the medication) Alli- 60 mg 3 times/day with	HA, flatus with discharge, fecal urgency, abdominal pain, steatorrhea, oily spotting, and increased defecation. These may decrease in frequency with time. Decreases absorption of fat-soluble vitamins Rarely reported: severe liver	Approved for long term use. Contraindications: chronic malabsorption syndrome, cholestasis Drug interactions: cyclosporine, decrease absorption of amiodarone and vitamin K (may affect warfarin).

		main meal containing fat	injury, oxalate-kidney injury.	
Phentermine-topiramate ER (Qsymia®) Schedule C-IV $240/month	Nonadrenergic sympathomimetic + topiramate (topiramate mechanism unknown for weight management)	3.75mg/23 mg once daily in the morning. After 14 days at starting dose, increase to 7.5mg/46mg once daily for 12 weeks. If at least 3% body weight not lost, can increase to 11.25mg/69mg once daily for 14 days, and then15mg/92mg if needed. If at least 5% of body weight is not lost, taper and discontinue therapy. Do not take doses in evening or later in day as may cause insomnia.	Paresthesia, dizziness, dysgeusia, insomnia, constipation, dry mouth, tachycardia, depression, anxiety, suicidal ideation, cognitive impairment	Approved for long term use. Abuse potential (due to phentermine) Rare cases of metabolic acidosis and kidney stones Contraindicated during pregnancy, hyperthyroidism, glaucoma, patients taking MAO inhibitors. Dose adjustment needed in renal dysfunction and moderate-severe hepatic impairment. For a planned surgery (refer to updated Medstar preoperative guidelines)
Naltrexone / Bupropion ER (Contrave®) (not a controlled substance)	Opioid antagonist + antidepressant Appetite / craving reduction	Target dose: 2 tabs (naltrexone 8 mg/ bupropion 90 mg per tab) twice daily.	Suicidal ideation/ suicidality, mood changes, seizures, increased heart rate and/or blood pressure, allergic	Approved for long term use. Minimize seizure risk by titrating dose, not exceeding max dose, and

$750/month		Start with 1 tab daily in the morning x 1 week, then 1 tablet twice daily x 1 week, then 2 tabs every morning and 1 tab every evening for 1 week, then full dose. D/c if not at least 5% decrease in baseline weight after 12 weeks at maintenance	reactions, hepatotoxicity, angle closure glaucoma, nausea, vomiting, headache, dizziness, constipation, dry mouth	avoiding taking dose with high fat meals. Contraindicated in patients with documented seizure disorder. Avoid concomitant use of efavirenz, lopinavir, or ritonavir. If used with clopidogrel or ticlopidine, reduce dose of Contrave to one tab in the morning and one tab in the evening. May increase levels of drugs metabolized by CYP2D6. Avoid with co-administration of MAOI; discontinue at least 14 days before starting or delay MAOI to 14 days after d/c naltrexone/bupropion. Discontinue opioids before starting; patient should be opioid-free for 7-10 days (short-acting opioids) or 14 days (long-acting opioids) before starting naltrexone/bupropion. Do not administer high fat meals; Do not crush or chew
Liraglutide (Saxenda®)	GLP-1 receptor agonist; reduced appetite and energy intake	Target dose: 3 mg subcutaneous once daily	Constipation. diarrhea, dyspepsia, fatigue, increased	Approved for long term use. Contraindicated with personal or family history

(Not a controlled substance) $500/month		(Start with 0.6 mg once daily then increase the daily dose by 0.6 mg each week to target of 3 mg once weekly at week five) Discontinue if at least 4-5% of baseline weight loss has not been achieved at 12 wks. on max tolerated dose or 16 wks. after initiation	heart rate, hepatitis, hypersensitivity, hypoglycemia (rare in patients without diabetes), nausea, renal impairment, suicidal ideation, vomiting.	of medullary thyroid carcinoma or multiple endocrine neoplasia syndrome type 2; Liraglutide contraindicated with pregnancy for obesity management. Avoid use in patients with suicidal ideation or history of suicide attempt, may worsen diabetic retinopathy with rapid control of blood glucose, monitor renal function with risk for acute kidney injury. Contraception required; may reduce effectiveness of oral contraceptives; use back-up method of contraception. For a planned surgery (refer to updated Medstar preoperative guidelines) Need to be held at least 7 days before surgery. Supplied as injector pen. When treatment is started, consider reducing the dose of any insulin secretagogues (e.g., sulfonylureas) the patient is taking to reduce the risk of hypoglycemia. If a patient is on insulin, dose reduction (by at least 20%) is needed. Monitor blood glucose.
Semaglutide (Wegovy®) (not a controlled substance) $1619/month	GLP-1 receptor agonist	Target dose: 2.4mg subcutaneous weekly Start with 0.25mg weekly for four weeks. Increase to 0.5mg weekly at week 5. Increase to 1mg weekly at week 9. Increase to 1.7mg weekly at week 13. Increase to target dose at week 17.	(Same as above for liraglutide)	

		Consider discontinuation if at least 5% of baseline body weight loss has not been achieved within 3 months		Monitor for risks and symptoms of thyroid tumors. Monitor for signs and symptoms of pancreatitis; stop drug if pancreatitis is suspected; do not restart if pancreatitis is confirmed. For liraglutide: Evaluate weight loss after 16 weeks and if at least 4% of body weight not lost, discontinue as treatment unlikely to be effective. See product specific information for specifics for administration with pen vs. needle use.
Tirzepatide (Zepbound®) (not a controlled substance) $1268/month	GIP receptor /GLP-1 receptor agonist	Target dose: 5mg subcutaneous weekly Start with 2.5mg weekly for four weeks. Increase to 5mg weekly at week 5. May further increase in 2.5mg/week intervals every 4 weeks, max weekly dose 15mg/week.	(Same as above for liraglutide)	Approved for long term use. Contraindicated with personal or family history of medullary thyroid carcinoma or multiple endocrine neoplasia syndrome type 2. Avoid use in patients with suicidal ideation or history of suicide attempt, may worsen diabetic retinopathy with rapid control of blood glucose, monitor renal function with risk for acute kidney injury. Contraception required; may reduce effectiveness

				of oral contraceptives; use back-up method of contraception. For a planned surgery (refer to updated Medstar preoperative guidelines) Need to be held at least 7 days before surgery. Supplied as injector pen. When treatment is started, consider reducing the dose of any insulin secretagogues (e.g., sulfonylureas) the patient is taking to reduce the risk of hypoglycemia. If a patient is on insulin, dose reduction (by at least 20%) is needed. Monitor blood glucose. Monitor for risks and symptoms of thyroid tumors. Monitor for signs and symptoms of pancreatitis; stop drug if pancreatitis is suspected; do not restart if pancreatitis is confirmed.

Table 7: Weight Negative Medications[12]

Medication	Class	Typical Dose	Side Effects	Other Relevant Information
Diabetes Mellitus Type II Medications				
Canagliflozin Invokana® - brand only	Sodium glucose co-	Recommended dose of the	Ketoacidosis, bone fractures, hyperkalemia,	Dose is adjusted based on renal function

Empagliflozin Jardiance® - brand only Dapagliflozin Farxiga® - brand only Ertugliflozin Steglatro® - brand only Sotagliflozin Inpefa® - brand only	transporter 2 inhibitor	given medical condition	genital mycotic infections, hypotension	
Acarbose Precose®	Alpha glucosidase inhibitor	Recommended dose of the given medical condition	Abdominal pain, diarrhea, bloating, flatulence, á LFTs	Only glucose can be used to treat hypoglycemia due to the medication's mechanism of action. Administer with the first bite of each main meal. Dose is adjusted based on renal function. Contraindicated in patients with inflammatory bowel disease, colonic ulceration, or intestinal obstruction.
Pramlintide SymlinPen®- brand only	Amylinomimetic	Recommended dose of the given medical condition	Hypoglycemia, headache, nausea, vomiting	Contraindications: gastroparesis, hypoglycemia unawareness Administer into abdomen or thigh only due to variable absorption through the arm. For patients also on insulin: Do not mix with insulin. Reduce pre-prandial insulin doses (rapid and short acting insulin and 70/30, 50/50, 75/25) by 50%.

Metformin Glumetza®, Riomet®	Biguanide	Recommended dose of the given medical condition	Nausea, diarrhea Vitamin B12 deficiency with chronic use	Administer with food to decrease GI side effects. For patients who will receive intra-arterial contrast or patients with eGFR between 30 and 60 or a history of liver disease or heart failure who will receive intravascular iodinated contrast media do not administer metformin at the time of or for 48 hours after procedures and resume therapy only when normal renal function returns. Avoid in patients with frequent alcohol use, or liver or kidney disease due to increased risk of lactic acidosis. If eGFR ≥30 and <45 mL/minute/1.73 m^2: Do not initiate therapy. In patients already receiving metformin, assess benefits and risks of continuing therapy; may continue at a reduced dose up to a maximum of 500mg 2x/day and stop metformin if nausea, vomiting, or dehydration occurs. If eGFR <30 mL/minute/1.73 m^2: Do not initiate therapy. If already on metformin, discontinue use.

				See MedStar Contrast guideline for instructions on holding metformin for imaging studies with contrast.
Liraglutide (Victoza®) Tirzepatide (Mounjaro®) Semaglutide (Ozempic®/ Rybelsus®)	GLP-1 agonist	Recommended dose of the given medical condition	See above section for liraglutide as anti-obesity medication	See above section for liraglutide as anti-obesity medication
Anti-seizure and Migraine Medications				
Topiramate Eprontia®, Qudexy XR®, Topamax®, Trokendi XR®	Anticonvulsant	Recommended dose of the given medical condition	Metabolic acidosis, abdominal pain, diarrhea, nausea, paresthesia Dose-related dizziness, drowsiness, and fatigue	Taper to discontinue to decrease risk of seizures and withdrawal symptoms
Zonisamide Zonegran®	Anticonvulsant	Recommended dose of the given medical condition	Dizziness, drowsiness	Taper to discontinue to decrease risk of seizures and withdrawal symptoms. Not recommended if eGFR<50 mL/min
Antidepressants				
Bupropion Aplenzin®, Wellbutrin®	Dopamine-norepinephrine reuptake inhibitor	Recommended dose of the given medical condition	Boxed Warning: risk of suicidal thoughts Tachycardia, constipation,	Taper to discontinue to decrease risk of withdrawal symptoms

			nausea, agitation, headache, dizziness, insomnia, dose-related seizure risk	
Fluoxetine** Prozac®	Selective Serotonin Reuptake Inhibitor	Recommended dose of the given medical condition	Boxed Warning: risk of suicidal thoughts Diarrhea, nausea, anxiety, drowsiness, headache, insomnia, tremor, decreased libido, pharyngitis.	Taper to discontinue to decrease risk of withdrawal symptoms. Long acting with long half-life

**AWP for 30 days of generic medication at highest dose unless stated otherwise*
*** variable weight loss response*

e. Surgery for Weight Loss:

Surgery is an option for weight reduction in some patients with severe and resistant obesity. Bariatric surgery causes both metabolic and anatomic restriction that results in reduced net caloric intake. Bariatric surgery can be considered in patients with either a BMI ≥ 40 or in those with BMI ≥ 35 with obesity-related comorbid conditions. These are patients who need further weight loss intervention as they have inappropriate response to diet, exercise and/or pharmacologic therapy. Patients with higher BMI (as indicated above) and "weight plateau" are also considered ideal candidates.

Bariatric surgeries include adjustable gastric banding, vertical sleeve gastrectomy (VSG), Roux-en-Y gastric bypass (RYGB), biliopancreatic diversion (BPD) biliopancreatic diversion with a duodenal switch[1]. The two Widely used procedures are Gastric bypass and Vertical Sleeve gastrectomy (VSG).

Nutritional deficiency in patients with Bariatric surgery: Post-bariatric surgical patients should be monitored periodically for the development of micro-nutrient deficiencies. This monitoring should ideally be done by the multidisciplinary bariatric surgery team but can also be supported by the primary care physician.

Table 7: Nutritional deficiency in patients with Bariatric surgery[14]

Micronutrient	Type of surgery in which monitoring is needed
Folate	All types of weight loss surgery
Iron	All types of weight loss surgery
Vitamin D	*All types of weight loss surgery*
Vitamin B12	*Roux-en-Y gastric bypass, Sleeve gastrectomy, Bilio-pancreatic diversion*
Thiamine	*"High risk" (female, African American, GI symptoms, heart failure, small bowel bacterial overgrowth, other risks for thiamine deficiency*
Vitamin A	*All types of surgery in first year*
Vitamin E and K	*If patient symptomatic (neuromuscular symptoms and hemolysis for vitamin E deficiency and bleeding for vitamin K deficiency)*
Zinc	*Roux-en-Y gastric bypass, Bilio-pancreatic diversion*
Copper	*Roux-en-Y gastric bypass, Bilio-pancreatic diversion.*

Complete recommendations can be found at: https://asmbs.org/wp/uploads/2008/09/ASMBS-Nutritional-Guidelines-2016-Update.pdf.

f. Weight-Loss Devices:

The following methods are approved by the FDA[15].

- Intragastric Balloon Systems - This is to delay the gastric emptying by placing various sizes and shapes of balloons in the stomach.
- Transpyloric Shuttle/Transpyloric Shuttle Delivery Device
- Space Occupying Device: hydrogel capsules: Plenity.
- Lap-Band Adjustable Gastric Banding System: This is a restrictive procedure resulting in a small portion of stomach available for food. This procedure is not much encouraged lately due to emerging side effects including perforation, infection, and slippage.
- Oral Removable Palatal Space Occupying Device – To limit bite size: Sensor Monitored Alimentary Restriction Therapy (SMART) Device
- Vagal Nerve blocking Therapy (Vbloc): A type of nerve block.
- Transoral Outlet Reduction (TORe) (Apollo Revise™ and Apollo Revise Sx™ Endoscopic Suturing System).

Intragastric Balloon Therapy: Intragastric balloon therapy is a minimally invasive, temporary (6-12 months depending on the brand) method of weight loss. A saline-filled balloon is inserted in the stomach, inducing a sense of satiety. Intragastric balloons can be used as a stand-alone weight loss intervention or as a bridge to bariatric surgery for those with BMI > 50 kg/m2. Weight loss of about 10% of total body weight can be achieved. Common side effects include nausea, vomiting, acid reflux and dyspepsia. Balloons left longer than the recommended duration are at risk of rupture and migration into the small intestine. Life threatening complications such as esophageal and gastric perforation have occurred. Most insurance companies do not cover this therapy.

Plenity (oral Superabsorbent Hydrogel): FDA approved them in 2019 for BMI between 25 to 40 kg/m² in conjunction with diet and exercise. These capsules consist of modified cellulose which is cross-linked with citric acid to create a 3-dimensional metrics. Each capsule has thousands of hydrogel particles. Recommended dose is 3 capsules 20 to 30 minutes before lunch and dinner with 500 mL of water. The main principle behind these capsules is to distend with food and water and occupy part of the stomach. This results in early satiety and fullness. They should be used with great caution in patients suffering from gastroesophageal reflux disease, gastric or duodenal ulcers. They should be avoided in patients with a history of strictures/Crohn's disease and/or any previous gastrointestinal procedures and motility disorders. For details, please refer to the 24-week trial (Gelesis loss of weight; GLOW trial) It showed that the mean weight loss was 6.4% in the treatment group versus 4.4% in the placebo group. Greater than 5% weight loss was achieved in 59% of the patients (as compared to 42% in the placebo group) and greater than 10% was achieved in 27% of the patients (as compared to 15% in the placebo group).[16,17] Interested patients should be referred to *https://www.myplenity.com*.

Transoral Outlet Reduction (TORe) (Apollo Revise™ and Apollo Revise Sx™ Endoscopic Suturing System): Offered to patients with weight gain after the Bariatric surgery. It aims at reducing the size b/w the stomach pouch and the small intestine. Can be repeated after a few years[18].

MedStar currently has bariatric surgery programs at three locations: MedStar Washington Hospital Center, MedStar Montgomery Medical Center, and MedStar Franklin Square Medical Center.

Combination Therapy:

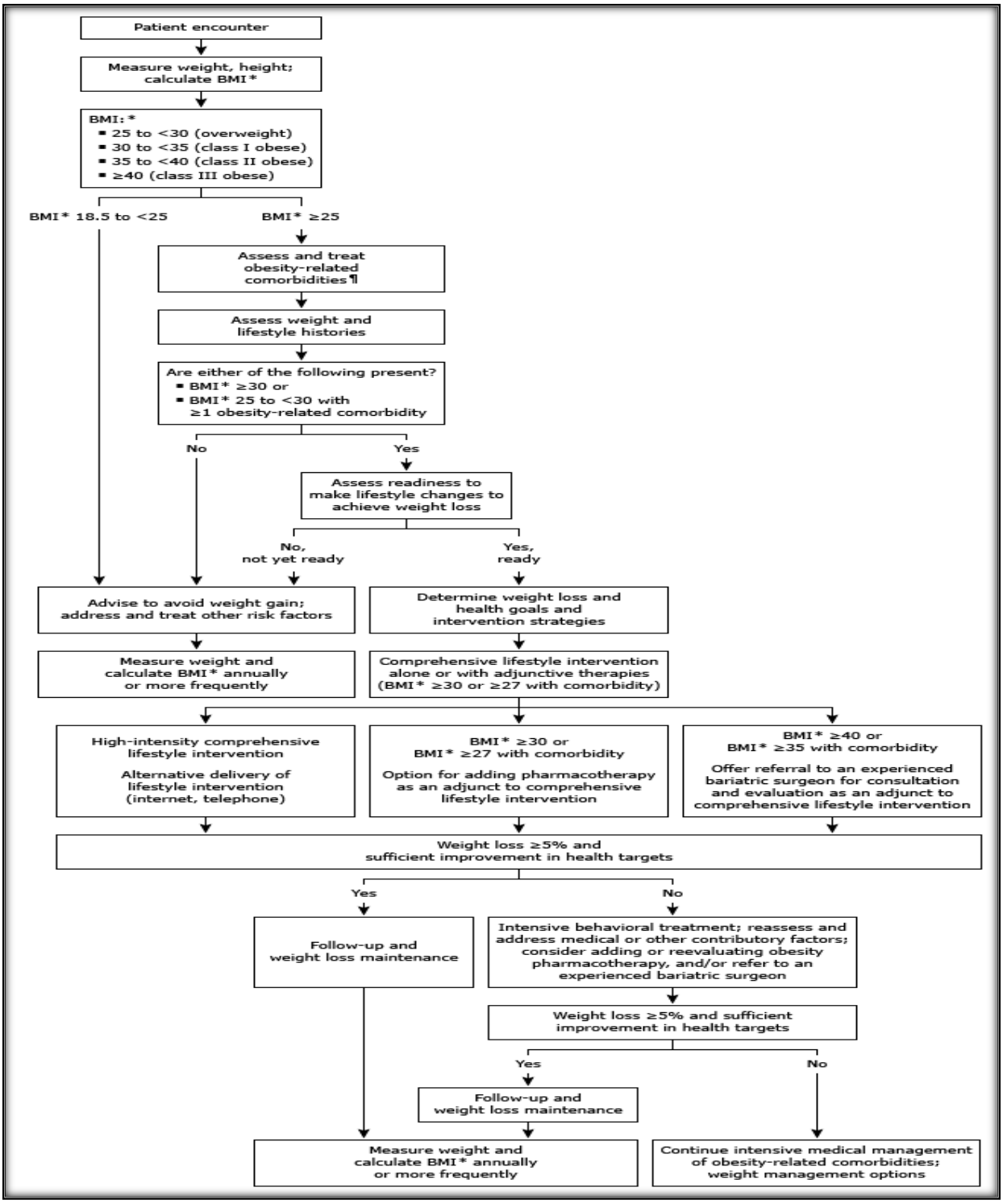
To achieve the greatest likelihood of success from a weight loss plan, combination therapy with nutritional intervention, increased physical activity, behavior intervention with/ without medication management is required.[12] Using Intense behavior therapy including frequent monitoring, incorporating some form of physical activity and using meal replacements have proven effective tools for weight loss and weight maintenance. Frequent monitoring will allow micromanagement of the triggers, stimulus control, and making fine changes to the plan based on food and exercise logs. Every patient is different but considering intense life-style intervention for 3-6 months before adding an anti-Obesity medication appears to be an effective and reasonable approach. However, in an appropriate candidate a weight loss medication could be considered earlier.

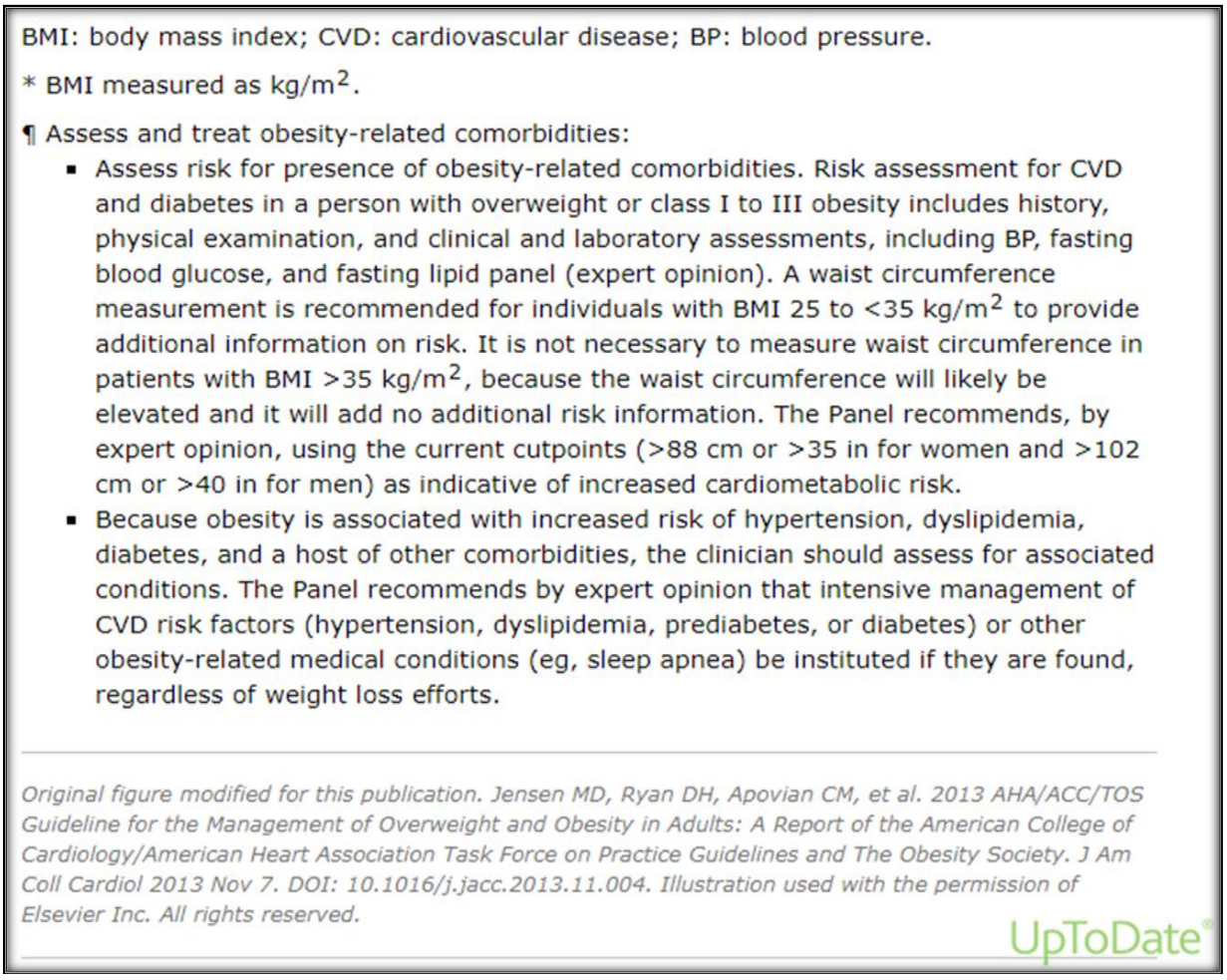
Medstar Resources:

- Referral to MedStar CoreLife weight management
- Referral to Medstar Weight Management program (at MedStar UMH)
- Referral to MedStar culinary medicine (virtual)

Patient Education:

Organization	Information	Links
American Obesity Association (AOA)	Newsletter, discounts on services and products, including prescription drugs. Annual membership dues are $25 for individuals, $40 for families, $50 for health care professionals.	American Obesity Association 1250 24th St. NW, Suite 300 Washington, DC 20037 800-98-OBESE http://www.obesity.org
National Institutes of Diabetes and Digestive and Kidney Disease	Fact sheets, article reprints, reports, videos, information on local dietitians.	https://www.niddk.nih.gov/health-information/weight-management
National Heart, Lung, and Blood Institute (NHLBI)	Food exchange list is used to trade one food item for another in each nutritional group.	https://www.nhlbi.nih.gov/health/educational/lose_wt/eat/fd_exch.htm
Center for Disease Control (CDC)	Food journal and food log, either one can be used to track daily caloric intake	https://www.cdc.gov/diabetes/prevention/pdf/t2/Handouts-Food_Log.pdf https://www.cdc.gov/healthyweight/pdf/food_diary_cdc.pdf
Center for Disease Control (CDC)	Physical activity diary and fitness log, either one can be used to track daily physical activity	https://www.cdc.gov/healthyweight/pdf/physical_activity_diary_cdc.pdf https://www.cdc.gov/diabetes/prevention/pdf/t2/Handouts-Fitness_Log.pdf
National Heart, Lung, and Blood Institute (NHLBI)	Aim for a Healthy Weight; The site has a variety of diet plans, food exchange lists and links recipes.	https://healthyeating.nhlbi.nih.gov/ https://www.nhlbi.nih.gov/health/educational/lose_wt/


Patient encounter
Measure weight, height; calculate BMI*
BMI:*
25 to <30 (overweight)
30 to <35 (class I obese)
35 to <40 (class II obese)
≥40 (class III obese)
BMI* 18.5 to <25
BMI* ≥25
Assess and treat obesity-related comorbidities¶
Assess weight and lifestyle histories
Are either of the following present?
BMI* ≥30 or
BMI* 25 to <30 with ≥1 obesity-related comorbidity
No
Yes
Assess readiness to make lifestyle changes to achieve weight loss
No, not yet ready
Yes, ready
Advise to avoid weight gain; address and treat other risk factors
Determine weight loss and health goals and intervention strategies
Measure weight and calculate BMI* annually or more frequently
Comprehensive lifestyle intervention alone or with adjunctive therapies (BMI* ≥30 or ≥27 with comorbidity)
High-intensity comprehensive lifestyle intervention
Alternative delivery of lifestyle intervention (internet, telephone)
BMI* ≥30 or BMI* ≥27 with comorbidity
Option for adding pharmacotherapy as an adjunct to comprehensive lifestyle intervention
BMI* ≥40 or BMI* ≥35 with comorbidity
Offer referral to an experienced bariatric surgeon for consultation and evaluation as an adjunct to comprehensive lifestyle intervention
Weight loss ≥5% and sufficient improvement in health targets
Yes
No
Follow-up and weight loss maintenance
Intensive behavioral treatment; reassess and address medical or other contributory factors; consider adding or reevaluating obesity pharmacotherapy, and/or refer to an experienced bariatric surgeon
Weight loss ≥5% and sufficient improvement in health targets
Yes
No
Follow-up and weight loss maintenance
Measure weight and calculate BMI* annually or more frequently
Continue intensive medical management of obesity-related comorbidities; weight management options


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

* BMI measured as kg/m^2.

¶ Assess and treat obesity-related comorbidities:

- Assess risk for presence of obesity-related comorbidities. Risk assessment for CVD and diabetes in a person with overweight or class I to III obesity includes history, physical examination, and clinical and laboratory assessments, including BP, fasting blood glucose, and fasting lipid panel (expert opinion). A waist circumference measurement is recommended for individuals with BMI 25 to <35 kg/m^2 to provide additional information on risk. It is not necessary to measure waist circumference in patients with BMI >35 kg/m^2, because the waist circumference will likely be elevated and it will add no additional risk information. The Panel recommends, by expert opinion, using the current cutpoints (>88 cm or >35 in for women and >102 cm or >40 in for men) as indicative of increased cardiometabolic risk.
- Because obesity is associated with increased risk of hypertension, dyslipidemia, diabetes, and a host of other comorbidities, the clinician should assess for associated conditions. The Panel recommends by expert opinion that intensive management of CVD risk factors (hypertension, dyslipidemia, prediabetes, or diabetes) or other obesity-related medical conditions (eg, sleep apnea) be instituted if they are found, regardless of weight loss efforts.

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

UpToDate®

Relevant information for the flow chart above from UpToDate
Resource: UpToDate-Obesity in Adults

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