

OBESITY IN OLDER ADULTS:

SUCCESSING IN A COMPLEX
CLINICAL SITUATION

Peer Review Panelists

Daniel Bessesen, MD

Professor of Medicine–Endocrinology/Metabolism/
Diabetes

University of Colorado School of Medicine
Denver, Colorado

Rodolfo J. Galindo, MD, FACE

Assistant Professor of Medicine

Emory University School of Medicine
Investigator, Center for Diabetes and Metabolism Research
Emory University Hospital Midtown
Medical Chair, Hospital Diabetes Taskforce
Emory Healthcare System
Atlanta, Georgia

Fatima Cody Stanford, MD, MPH, MPA, FAAP, FACP, FAHA, FTOS

Obesity Medicine Physician Scientist

Massachusetts General Hospital and Harvard
Medical School
Boston, Massachusetts

Kathryn N. Porter Starr, PhD, RD

Assistant Professor of Medicine-Geriatrics

Duke University School of Medicine
Research Health Scientist
Durham VA Medical Center
Durham, North Carolina

Acknowledgments

Support was provided by Novo Nordisk.

About The Gerontological Society of America

The mission of The Gerontological Society of America (GSA) is to: (1) promote the conduct of multi- and interdisciplinary research in aging by expanding the quantity of gerontological research and by increasing its funding resources; (2) disseminate gerontological research knowledge to researchers, practitioners, and decision and opinion makers; and (3) promote, support, and advocate for aging education, and education and training in higher education.



TABLE OF CONTENTS

4	INTRODUCTION
4	EVALUATING OVERWEIGHT/OBESITY IN OLDER ADULTS
5	Diagnosing Overweight/Obesity in Older Adults
8	Emerging Concepts in Etiology and Pathophysiology of Obesity
9	THERAPEUTIC MANAGEMENT OF OBESITY
9	Barriers to Treatment
10	Nonpharmacologic and Behavioral Approaches
11	Pharmacologic Interventions
11	Phentermine/Topiramate ER
13	Naltrexone ER/Bupropion ER
13	Liraglutide 3mg
14	Orlistat
14	Metabolic and Bariatric Surgery
14	CONCLUSION
15	RESOURCES
15	REFERENCES

INTRODUCTION

The vexing problem of the increasing weight of Americans has grown to epidemic proportions in recent decades. As millions of Baby Boomers enter older adulthood, they bring with them added pounds and the challenges of excessive body fat. Now recognized as a chronic medical condition, obesity is associated with serious health problems that increase morbidity and mortality, stigmatization at work and in social settings, decreased physical function, lower health-related quality of life, and increased direct and indirect health care costs. When combined with common aging-related challenges, obesity can create complex clinical situations without easy solutions.

Views on the nature of obesity have been evolving for a half century, and this progress culminated in recognition of obesity as a complex chronic disease with a pathophysiologic basis by the American Medical Association in 2013. This increasing recognition of obesity as a chronic disease that should be diagnosed and treated helps to avoid the stigma and confusion associated with the condition.^{1,2}

During the coronavirus disease 2019 (COVID-19) pandemic, advanced age was the most common risk factor for virus-related hospitalization, intensive-care-unit admission, intubation or mechanical ventilation, or death, followed by obesity among all age groups. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infected people in all demographic and socioeconomic categories,³ but mortality was most common in people of advanced age, those with obesity, residents of long-term care facilities, and men. Other risk factors for severe illness included diabetes, heart disease, chronic respiratory disease, kidney disease, and cancers.^{4,5}

Combining these realities with those inherent in the aging process, obesity in older adults provokes serious problems. In this overview, the evaluation, consequences, and clinical management of obesity and overweight are reviewed with a focus on the unique challenges of this condition in older adults with other chronic diseases, mobility deficits, and other compromises in activities of daily living.

EVALUATING OVERWEIGHT/OBESITY IN OLDER ADULTS

Overweight. Obesity. Severe obesity. What do these terms mean, and how are people diagnosed with these conditions? What causes weight gain, and why is the situation worsening so quickly?

One thing is for sure: People's body sizes have increased greatly over the past 4 decades. By 2016, more than 1.9 billion adults worldwide were overweight, including 650 million people with obesity.⁶ The situation was even more dire for adults aged 20 years or older in the United States, where the age-adjusted prevalence statistics for obesity and severe obesity were 42.4% and 9.2%, respectively, in 2017–2018. Among Americans aged 60 years or older, 42.2% of men and 43.3% of women had obesity.⁷ The trend is expected to continue throughout the 2020s; by 2030, nearly half of Americans will have obesity, and severe obesity will be the most common weight category among women, non-Hispanic Black adults, and low-income adults.⁸

Obesity is now recognized by experts as a disease of body weight regulation; outdated ideas stating that obesity is a problem of willpower are not accurate. Current evidence shows that weight is regulated just like blood pressure or blood glucose, and obesity is a disease of weight regulation just as hypertension is a disease of blood pressure regulation and diabetes is a disease of glucose regulation. Emerging concepts especially pertinent to older adults include new findings on hormonal influences of weight homeostasis, the effects of age at onset of obesity, nutrition and sarcopenia, and the impact of exercise, comorbid conditions, and functional status.

Diagnosing Overweight/Obesity in Older Adults

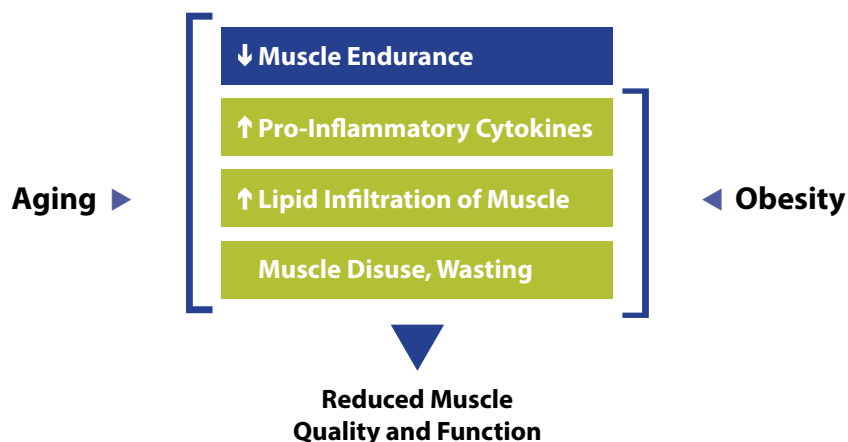
Obesity implies 3 defects of body fat: excess, distribution, and/or function. The presence of excessive fat mass can be measured through weight and the commonly used metric of body mass index (BMI), and altered distribution of fat is evident through body measurements such as waist circumference. Function is more difficult to measure, as measures of changes in biochemical indicators are not yet available in most clinical settings. This scientific recognition of obesity is important nevertheless, because it implies that this is a medical condition that can be prevented (primary), treated to prevent worsening and development of complications (secondary), and treated if complications develop to prevent progressive disease and manage the complications (tertiary).

While emphasis has been placed on a person's BMI—calculated as mass (weight) in kilograms divided by the square of height in meters (kg/m^2)—emerging evidence is showing that waist circumference is an equally if not more important measure for avoiding adverse health risks in both men and women.⁹ Central obesity, reflected in larger-than-optimal girth, is associated with increased risks of conditions such as metabolic syndrome, diabetes, and hypertension and other cardiovascular disorders.¹⁰

The American Association of Clinical Endocrinology recommends the use of the World Health Organization (WHO) body fat thresholds for the diagnosis of obesity—men with more than 25% body fat and women who have more than 35% body fat. However, most people do not have access to an accurate way of measuring body fat; the WHO thresholds also use waist circumference (men ≥ 102 cm [≥ 40 inches] and women ≥ 88 cm [≥ 35 inches]) as a visceral fat surrogate.¹⁰

In older adults, the loss of protein-rich skeletal muscle tissues is common. Termed sarcopenia, age-related loss of muscle mass and muscle strength can result from disuse of muscles because of activity-limiting conditions or a sedentary lifestyle, hormonal changes, poor nutrition, and/or altered neurologic or vascular activity that compromises muscle function (Figure 1). With aging, muscle mass can decline while fat mass increases, leaving overall weight relatively unchanged. In this situation, obesity-related complications continue as a result of the body's higher percentage of fat—a condition termed sarcopenic obesity.¹¹⁻¹⁴

Figure 1. Effects of Aging and Obesity on Muscle Quality and Function



Source: Adapted from reference 14. Published by Oxford University Press on behalf of the American Society for Nutrition. This work is written by U.S. Government employees and is in the public domain in the United States.

BMI, used as a proxy for weight status, fails to provide a direct measure of obesity. However, since BMI has been central to assessment of obesity for several decades, most clinicians rely on this measure to determine when action is needed and to talk with patients about the need for interventions. As shown in Table 1, BMIs of 18.5–24.9 are considered healthy for most people; BMIs should be 23 or less in certain racial/ethnic groups with smaller body frames.¹⁰ The BMI cutoffs, when defined by gender and race/ethnicity (Black, Hispanic, White) and associated with the components of metabolic syndrome (hypertension, dyslipidemia, diabetes), range from 26 to 33.¹⁵

Table 1. Clinical Characteristics and Interventions in Patients With Obesity

BMI ^a	Comorbidity Risk		Chronic Disease Phase	Interventions		
	Normal WC ^b	Increased WC ^b				
<18.5 (underweight)	Low but other concerns		Primary	Not addressed in this publication		
18.5–24.9 (<23 for some races/ethnicities) (normal weight)	Average		Primary	Reinforce healthy habits		
				Lifestyle: Diet, physical activity, behavioral therapy	Medications	Surgery
25–26.9 (overweight)	Increased	High	Secondary	+ (with comorbidity)		
27–29.9 (overweight)	Increased	High	Secondary		+ (with comorbidity)	
30–34.9 (obesity class I—mild)	Moderate	Very high	Tertiary	+	+	
35–39.9 (obesity class II—moderate)	High	Very high	Tertiary	+	+	+ (with comorbidity)
≥40 (obesity class III—severe)	Very high	Very high	Tertiary	+	+	+

^aBMI is calculated as mass (weight) in kilograms divided by square of height in meters (kg/m²).

^bIn the United States and Canada, waist circumference is normal when 40 inches (102 cm) or less in men and 35 inches (89 cm) or less in women. Lower cutoff points are appropriate in other countries (94 cm and 80 cm for men and women, respectively).

Abbreviations: BMI, body mass index; WC, waist circumference.

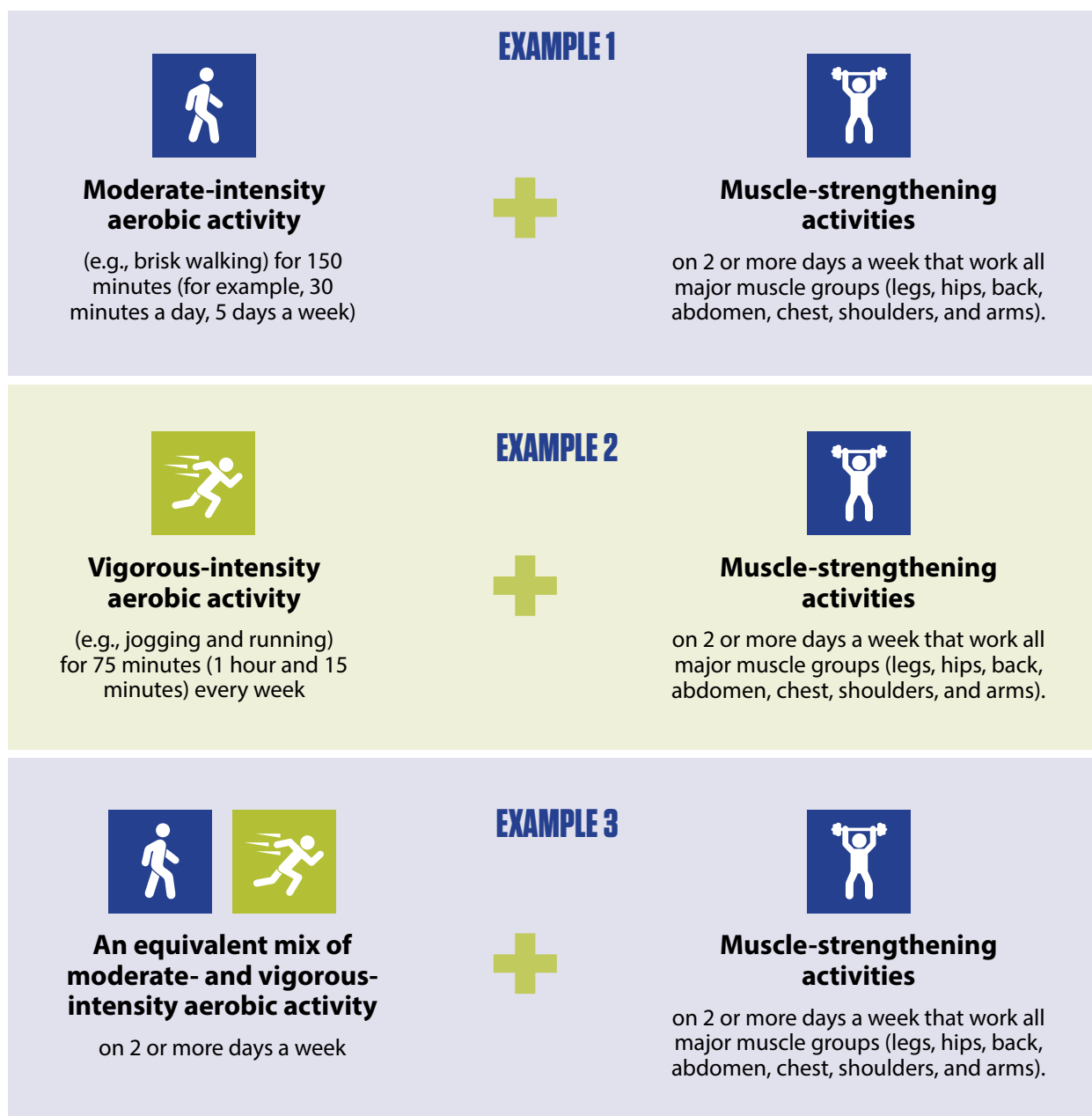
Source: Reference 10.

In older adults and in menopause, loss of bone mass can complicate assessment of obesity. Especially common in those with limited mobility or disabilities, bone mass must be considered in evaluating weight in older adults and other affected individuals. Measurement of bone density is useful in this evaluation, as is presence of bone-depleting conditions such as osteomalacia and osteoporosis.¹⁴

The potential deficiencies in protein and bone mass in older adults—combined with lower than optimal levels of vitamin D secondary to decreased outdoor activities and poor nutrition resulting from changes in taste, smell, appetite, dentition, and swallowing that can occur in aging—create additional barriers to safe dietary modification. Further, in older adults, traditional weight loss regimens can lead to 25% or more of total weight loss¹⁶ and loss of bone mineral density.¹⁷

To combat loss of muscle mass with caloric restriction alone, interventions that should be considered are adequate protein intake, resistance exercise, and aerobic exercise (Figure 2). Registered dietitians and registered dietitian nutritionists can assess older adults who are striving to lose weight with caloric restriction and help make sure they have their required dietary intake of macronutrients and micronutrients. Health care providers should be cautious when recommending weight loss alone without providing the necessary information to prevent further muscle and bone loss.¹⁸⁻²⁰

Figure 2. Recommended Amount and Types of Weekly Activity for Adults



Source: Reference 19. This work is written by U.S. Government employees and is in the public domain in the United States.

Older adults also face a unique set of social isolation and equity concerns based on social determinants of health that can affect their nutritional status and ability to address excessive fat mass. During the COVID-19 pandemic, these concerns have become more common as well as more apparent for older adults, affecting the three A's—accessible, affordable, and available—with respect to diet, nutrition, and options for exercise outside the home and weight management in general.

Already socially isolated by mobility deficits and loss of spouses and companions, many older adults face challenges related to the social determinants of health. In addition to needing to live within fixed incomes, older adults may live in “food deserts” where access to healthy nutrients is difficult or impossible. Transportation options have been reduced during stay-at-home orders, and many older adults are not venturing into the community for fear of becoming infected with SARS-CoV-2. Food insecurity has increased, and older adults are more often dependent on home delivery of foods or meals, decreasing their ability to control their dietary intake.

Poor diet quality and obesity have also been associated with increased risks of cognitive impairment, possibly due to systemic inflammation, hormonal changes, and glucoregulatory and cardiovascular changes. Decline in cognitive function presents yet another challenge as people age with obesity.²¹

Emerging Concepts in Etiology and Pathophysiology of Obesity

A range of factors play an important role in the regulation of weight and the development of obesity, including genetics, environmental factors, and hormones (e.g., appetite modifiers, estrogen, testosterone).

Specific genes or mutations have been identified that affect weight and the distribution of fat stores, and genetics is thought to play a major role in obesity and overweight. As much as 40% to 70% of the variance in BMI and body fat distribution could be determined by people's genetics.²²

Family and social networks are also important in weight gain. Obesity and overweight can be common among groups of people with similar dietary habits. In fact, the overall American society has been dubbed obesogenic because of the wide availability of large portions of highly palatable, energy-dense foods and beverages in the United States.²³ Highly processed foods are particularly problematic in this environment. For preventing and treating obesity, limiting the intake of highly processed foods could be an effective strategy.²⁴

Medical conditions and medications have important influences on weight. Binge eating disorder and depression affect nutrient intake, and some medications are associated with weight gain (particularly agents used for the treatment of psychological conditions such as depression and anxiety, and some medications used to treat diabetes, hypertension, nerve pain, and other conditions).²⁵ Use of antidepressants, beta-blockers, and insulin has been associated with weight gain.²⁶

Research into the regulation of appetite and energy balance has produced a number of potential therapeutic targets with utility in pharmacotherapeutic management of weight. Increasingly, weight loss and maintenance of weight loss are recognized as challenging in some individuals because of the effects of intrinsic factors and signaling molecules that control appetite, satiety, and energy utilization through effects in the brain, hypothalamus, gastrointestinal tract, and other organs. Because weight is regulated, a loss of body mass leads to adaptive responses, including increased appetite and reduced energy expenditure that promote weight regain. However, long-term weight loss is possible, as shown by people who have had long-term success such as those in the National Weight Control Registry.²⁷

The age of onset of obesity is also recognized as important in development of complications, particularly type 2 diabetes. Reduction in the cumulative exposure to obesity by preventing or delaying weight gain is an emerging goal of health promotion efforts in this field. Weight tends to gradually increase as people age, leading to an increased prevalence of obesity with age until about age 70, after which many people experience modest weight loss.²⁸

THERAPEUTIC MANAGEMENT OF OBESITY

Management of excessive or maldistributed fat mass begins with recognition of obesity as a chronic medical condition that must be addressed over the life course through multimodal interventions. As with many conditions presenting when people reach older adulthood, decisions should be tempered by consideration of which interventions are most likely to be successful given the presence of other conditions and which are worthwhile given the fewer number of expected life-years remaining.

For many people with overweight and obesity, a 3-pronged lifestyle therapy approach can be successful through use of dietary modification, physical activity, and behavioral modifications. Even then, though, the weight can be difficult to lose and often returns after the intervention period.¹⁰

More aggressive treatments such as antiobesity medications and surgery provide more weight loss but can be associated with more cost and potential adverse effects. With each treatment, there is tremendous variability in response from person to person; flexibility and learning from the response to treatment is critical. Because obesity is a chronic disease, treatments will only work as long as a person adheres to them. This means that the person and care provider should strive to find sustainable solutions that balance the desire for more weight loss with the level of commitment to treatment and acceptance of risk that is right for that person.¹⁰

In older adults with overweight and obesity, structured lifestyle interventions with dietary modifications and exercise should have clear clinical goals, such as prevention of type 2 diabetes, reductions in blood pressure, and/or improvements in mobility and conditions that limit physical function (e.g., osteoarthritis). The relationship between BMI and mortality is curvilinear with increased mortality as BMI increases. However, the shape of this curve is flatter in older individuals.²⁹ Thus, the relative risk of obesity is less in older adults than in younger individuals. Additionally, since sarcopenia is a common problem in older adults and weight loss through caloric restriction alone can lead to a loss of lean mass, the benefits of dieting are less and the risks greater in older adults as compared with younger individuals, making a focus on discrete clinical goals more important drivers of the decision for weight loss in these people.¹⁰

Barriers to Treatment

As a condition that often begins in childhood and continues throughout life, obesity can be challenging in that the body responds to weight loss by conserving energy and altering appetite and satiety signals in a manner that increases the drive for food intake. Inaccurate messages focused on individual choices and behaviors are perpetuated in the media further compromising people's control over their weight; the recognition of obesity by the public health and scientific communities as a disease with medical and community components needs to diffuse into consumer media.³⁰

During encounters with health care providers, weight bias remains a barrier to obesity treatment. The persistent belief that obesity is not a disease but a lifestyle choice leads many physicians to view patients with obesity negatively or harbor an unconscious bias. This can stem from the difficulties that clinicians who do not personally struggle with weight have in understanding how people can become obese.^{31,32}

Beyond those challenges, other barriers await individuals with overweight and obesity. These include policy decisions made in the past based on now-outdated assumptions that excess fat stores are a problem of the individual with a lack of willpower. Even the Medicare program is flawed in this regard; simple nonpharmacologic, behavioral, and pharmacologic interventions are not reimbursed by the insurance program that covers most older Americans, yet the program will pay for surgical interventions. Intensive behavioral interventions are reimbursed only when provided by primary care physicians or other providers, but such programs are generally and best offered by interprofessional care teams comprising dietitians, nurses, educators, physical therapists (or, as appropriate, physical activity trainers or coaches), and clinical psychologists.¹⁰

Such situations further challenge older adults who are trying to overcome this chronic disease in a society where excess calories are plentiful and heavily marketed.

Nonpharmacologic and Behavioral Approaches

The 3-pronged approach to therapy for people with overweight or obesity includes reduced-calorie healthy meal plans, physical activity, and behavioral interventions. For older adults, these efforts may require modification by the interprofessional team. Physical activity is key for older adults, and caution is needed to be sure that weight loss does not lead to further muscle and bone loss and increased risk of falls.

Dietary approaches to weight loss are part of the popular culture in the United States and other countries. Fad diets such as Atkins, Zone, and South Beach typically focus on modifying dietary macronutrients—carbohydrates, proteins, and fats—and this can be problematic in older adults who may have sarcopenic obesity or other protein-wasting conditions. An adequate supply of high-quality protein has been shown to positively affect health and physical function during dieting, and the intake of calcium is very important for bone health. Vitamin D supplements are also often needed to maintain serum levels of this nutrient sufficient to ensure proper bone modeling.^{14,33}

The second component of a structured lifestyle intervention program for weight loss is physical activity. This is needed for both burning calories through resistance and aerobic exercise and for maintaining bone health through stimulation of bone modeling. Older adults with excess weight, those with disabilities or activity-limiting conditions such as knee osteoarthritis, and people with cognitive decline may have difficulty with activity regimens. Special programs tailored by physical therapists or other exercise professionals with experience working with older individuals are needed. In addition to intensive physical activity, an increase in leisure-time activities such as walking is important for long-term maintenance of weight loss.^{11,34}

Increased physical activity alone does not typically provide much weight loss but appears to be important in preventing weight gain and maintenance of weight loss. Thus, exercise is a potentially important approach in older adults and postmenopausal women for preventing weight gain.³⁵ The Centers for Disease Control and Prevention (CDC) recommends that people aged 65 years or older get at least 150 minutes per week of moderate-intensity activity such as brisk walking plus at least 2 days per week of muscle-strengthening activities (Figure 2 and Table 2).^{19,20,36}

Table 2. Components of Therapy of Sarcopenic Obesity

Dietary Interventions	Aerobic Exercises	Resistance Exercises
<ul style="list-style-type: none">• Caloric restriction (500–1,000 kcal/day) or weight loss goal of about 0.5 kg/week (8% to 10% loss at 6 months), then weight maintenance• Protein supplements to mitigate loss of muscle mass and strength• Calcium (1,200 mg/day supplemental calcium, preferably through dietary measures), vitamin D supplements (1,000 IU/day as needed to maintain serum concentrations of ≥ 30 ng/mL) to maintain bone health	150 minutes/week of moderate to vigorous aerobic exercise	60–75 minutes 2–3 times weekly with focus on strength, balance, and flexibility

Sources: References 13, 19, and 20.

Flexibility and balance training are very important in physical activity exercises, the CDC recommends. Maintaining the ability to bend over and avoid tipping over can help prevent falls that result in fractures and can be exceptionally detrimental in older adults, especially those with depleted calcium stores or osteomalacia/osteoporosis. Standing on 1 foot is a particularly useful exercise for older adults to use in balance training.^{19,20,36}

Changing daily habits and the ways people think about food and activity is the third component of nonpharmacologic weight loss. Behavioral interventions offered by the interprofessional care team include self-monitoring of weight, food intake, and physical activity; clearly defined and achievable goals; education pertaining to obesity, nutrition, and physical activity; individual and group meetings; stimulus control; systematic approaches for problem solving; stress reduction; cognitive restructuring through cognitive behavioral therapy; motivational interviewing; behavioral contracting; psychological counseling; and mobilization of social support structures.¹¹

Pharmacologic Interventions

Antiobesity medications can be a useful adjunct to lifestyle interventions in selected individuals. They produce larger decreases in body weight than are achieved with lifestyle changes alone, and their continued use helps keep the weight off. Because obesity is a chronic disease similar to hypertension and diabetes, antiobesity medications need to be used long term for sustained benefits. If people take blood pressure medication and their blood pressure comes down, it will not stay down if their medication is stopped. The same is true of antiobesity medications. The benefits of the medication will dissipate, and weight will gradually return if the medications are stopped. In older adults, the presence of multiple health conditions requiring drug treatment creates the potential for detrimental drug interactions, adverse effects, and polypharmacy; therefore, a careful consideration of these potential interactions is needed.

Four products are currently approved by the U.S. Food and Drug Administration (FDA) for long-term weight management. As shown in Table 3, the agents fall into different pharmacologic categories, creating the need to tailor therapy to the specific clinical situation of each patient.

Guidelines suggest weight loss medications could be considered in patients with a BMI greater than 27 with a weight-related comorbidity or a BMI greater than 30 without associated comorbidities. If the patient wants to try an antiobesity medication, a choice can be made regarding which medication to use and a therapeutic trial undertaken to monitor for effectiveness and side effects. If the patient has not lost 5% or more of baseline weight by 3 months, a reassessment is in order. Adherence should be addressed if this is a factor, along with intolerance and other reasons that the patient may not be taking the medication as directed. If these factors are not present or patients continue to not lose weight, the medication should be stopped due to a lack of efficacy and consideration of another medication entertained.

Phentermine/Topiramate ER

Phentermine is frequently prescribed as an individual agent for short-term weight loss. Combined with the antiepileptic drug topiramate in an extended-release formulation, phentermine is approved by FDA for chronic weight management in patients with obesity.¹⁰ This combination is the most effective of the currently available medications.³⁷

The product is recommended for patients with depression or seizure disorders, in those on chronic opioid therapy, and in patients who have regained weight after bariatric surgery.^{10,38} Side effects can include numbness and tingling of fingers and some fuzziness of thinking in some patients. These side effects resolve when the medication is stopped. While effects on heart rate and blood pressure must be monitored, phentermine/topiramate ER can be used with caution for weight management in patients with controlled hypertension or stable cardiovascular disease.^{10,38}

Phentermine/topiramate ER is contraindicated in the conditions listed in Table 3, and its use in patients with severe renal impairment is not recommended. Caution is recommended if the product is used in patients with a history of nephrolithiasis, and the dose should be lowered in patients with hepatic impairment.¹⁰

Phentermine is the most commonly prescribed antiobesity medication even though it is not approved by FDA for long-term use; 76.6% of prescriptions for antiobesity medications in 2009 through 2015 were for phentermine.³⁹ There are concerns about its potential to increase cardiovascular risk through increased blood pressure and pulse, making it relatively contraindicated in older individuals who are at higher risk for heart disease.

Table 3. FDA-Approved Medications for Long-Term Management of Obesity

Agents	Mechanisms of Action	Approved Indications	Considerations When Used in Older Adults	Key Feature
Phentermine/topiramate ER	Anorexiant/anticonvulsant/sympathomimetic	Chronic weight management as adjunct to reduced-calorie diet and increased physical activity in adults with BMI ≥ 30 or ≥ 27 in presence of other risk factors (e.g., hypertension, type 2 diabetes, dyslipidemia)	<ul style="list-style-type: none"> • Is a Schedule IV controlled substance • Has numerous drug interactions and requires close monitoring • Contraindicated in glaucoma, hyperthyroidism, and during or within 14 days of MAOI therapy • REMS program restricts availability to certified pharmacies; warns of increases in suicidal ideation and other ADRs 	Produced the greatest weight loss in clinical trials
Naltrexone ER/bupropion ER	Opioid antagonist/antidepressant	Chronic weight management as adjunct to reduced-calorie diet and increased physical activity in adults with initial BMI ≥ 30 or ≥ 27 in presence of other risk factors (e.g., hypertension, type 2 diabetes, dyslipidemia)	<ul style="list-style-type: none"> • Has boxed warning about increases in suicidal ideation • Has contraindications, including use in uncontrolled hypertension and current long-term use of opioids • May make patients susceptible to anxiety 	May be useful in patients with depression or food cravings
Liraglutide 3mg	GLP-1 receptor agonist	Chronic weight management in adults with initial BMI ≥ 30 or ≥ 27 in presence of other risk factors (e.g., hypertension, type 2 diabetes, dyslipidemia) and in adolescents aged 12 years or older with body weight >60 kg and initial BMI corresponding to 30 in adults	<ul style="list-style-type: none"> • Should not be used with other products containing liraglutide or other GLP-1 receptor agonists • Patients should be monitored for depression or suicidal thoughts • Contraindicated in patients with personal or family history of MTC/MEN2 	
Orlistat	Lipase inhibitor	Weight loss and maintenance in conjunction with reduced-calorie diet in adolescents or adults aged 12 years or older with BMI ≥ 30 or ≥ 27 in presence of other risk factors (e.g., hypertension, diabetes, dyslipidemia)	<ul style="list-style-type: none"> • Available by prescription and over the counter • No dosage adjustments needed in renal or hepatic dysfunction/failure 	Available without a prescription; while not tolerable for many patients, this is the safest of the available products

BMI is calculated as mass (weight) in kilograms divided by square of height in meters (kg/m^2).

Abbreviations: ADRs, adverse drug reactions; BMI, body mass index; ER, extended release; FDA, U.S. Food and Drug Administration; GLP-1, glucagon-like peptide 1; MAOI, monoamine oxidase inhibitor; MEN2, Multiple Endocrine Neoplasia syndrome type 2; MTC, medullary thyroid carcinoma; REMS, Risk Evaluation and Mitigation Strategy.

Source: Reference 10 and product labeling (available online at Drugs@FDA).

Naltrexone ER/Bupropion ER

Naltrexone, an opioid antagonist used for alcohol and opioid use disorders, and bupropion, an antidepressant also used for smoking cessation, have been shown to decrease appetite when used in combination in an extended-release formulation. The complementary effects of these 2 drugs reduce food intake through actions on the hypothalamus and central reduction of compulsive feeding behaviors.^{10,12}

Naltrexone ER/bupropion ER can be used in patients with cardiovascular disease with monitoring and is a preferred agent (as is liraglutide 3 mg) in patients with a history of nephrolithiasis. Dosage adjustments are needed when naltrexone/bupropion are used in patients with moderate hepatic impairment (maximum dosage of naltrexone 8 mg/ bupropion 90 mg in the morning).¹⁰

This combination product should not be used in patients with severe renal impairment, and caution is needed in those with mild-to-moderate renal impairment. It can be used in people with controlled hypertension and stable cardiac disease. Monitoring of heart rate and rhythm is required when this product is used in patients with cardiac arrhythmias. The combination should not be used in patients being treated with another selective serotonin reuptake inhibitor and/or opiate.¹⁰ This combination is intermediate in effectiveness and side effects compared with other currently available agents.

Liraglutide 3 mg

Liraglutide in doses of 3 mg—higher than the 1.2 mg and 1.8 mg doses used for glycemic control in people with type 2 diabetes—is approved by FDA for the treatment of obesity. This agent, an analogue of gastrointestinal hormone glucagon-like peptide 1 (GLP-1), acts in the gut to slow gastric emptying and in the brain to increase satiety. It is given by a daily injection.^{10,12}

The main adverse effects of liraglutide 3 mg are nausea and vomiting, which occur at higher rates than those seen at the lower doses used to treat hyperglycemia. The agent can be used in patients with renal failure when management of obesity is a reasonable therapeutic goal in these individuals.¹⁰

Liraglutide 3 mg is a preferred agent in patients with existing hypertension (as is orlistat). It is also a preferred agent in patients with a history of nephrolithiasis or glaucoma. Monitoring of heart rate and rhythm is required when this product is used in patients with cardiac arrhythmias.¹⁰

Liraglutide 3 mg has a boxed warning about an increased risk of thyroid C-cell tumors, including medullary thyroid carcinoma, and is contraindicated in people with a personal or family history of this condition or multiple endocrine neoplasia syndrome type 2. Liraglutide may be associated with an increased risk of pancreatitis and should be used with caution in people with a history of pancreatitis. Like other medications used for weight management, use of liraglutide 3 mg should be avoided in patients with severe hepatic impairment and used with caution in those with hepatitis impairment.¹⁰

Another GLP-1 agonist, semaglutide, is in clinical trials for use in people with overweight and obesity and under review by FDA.⁴⁰ Administered once weekly by subcutaneous injection, semaglutide plus lifestyle intervention produced mean changes in body weight of nearly 15% in a 68-week trial, compared with reductions of 2.4% among those on placebo plus lifestyle intervention.^{41,42} An oral formulation of this drug is marketed for treatment of type 2 diabetes.

Orlistat

Available in both prescription and nonprescription formulations, orlistat inhibits intestinal lipase, an enzyme needed for fat absorption. Because little of the drug is absorbed, it causes few systemic adverse effects and is safe to use in many of the concomitant conditions common in patients with obesity. However, weight loss is modest with this product, and its effects on the gastrointestinal tract have limited its acceptability to many patients. Orlistat leaves much of the dietary fat in the stool, thereby creating side effects such as abdominal pain, flatulence, soft stools, or even fecal incontinence. Limiting the dietary intake of fat can help minimize the adverse gastrointestinal effects.¹⁰

Because of the potential for deficiencies in fat-soluble vitamins, people using orlistat should use a multivitamin daily. Orlistat should be used with caution in patients with nephrolithiasis.¹⁰

Metabolic and Bariatric Surgery

Bariatric surgery is recognized as a viable option for patients with class II (moderate) obesity (BMI ≥ 35 but < 40) with obesity-related comorbidities such as type 2 diabetes, and obstructive sleep apnea, and class III obesity (BMI ≥ 40) when lifestyle interventions and medications have failed to reduce fat stores sufficiently. When needed and used in a motivated patient, positive outcomes result, regardless of age. With the mean age at death of people in developed countries now at 80 years or more, the use of bariatric surgery to treat severe obesity in people older than 60 years of age is a reasonable option to consider.^{43,44}

In older adults, a variety of factors must be assessed in deciding whether bariatric surgery is a good choice. Any surgical procedure involving general anesthesia is challenging in older adulthood, and the risks are increased when the gastrointestinal tract is involved. Most patients with this degree of obesity after age 65 have other complications, which may increase surgical risks. Further, physical and/or cognitive limitations can limit a person's ability to manage the postoperative period, obtain and prepare the special diets and nutrients needed after this surgery, and combine those interventions with an adequate exercise regimen.

Older adults who undergo metabolic and bariatric surgery should receive the necessary attention to presurgical nutrition and postsurgical care. As discussed earlier, protein supplementation is especially important in older adults to avoid inducing muscle wasting and the complications associated with sarcopenia. Following bariatric surgery, patients will need ongoing vitamin supplementation and monitoring to prevent deficiencies of vitamins and micronutrients, including vitamin D and calcium to prevent osteoporosis, vitamin B¹², iron, folate, and others.⁴⁵

CONCLUSION

The chronic medical condition of obesity is increasingly common in older adults and is initially addressed through lifestyle interventions, including diet modifications and exercise programs. When these do not achieve the necessary reductions in fat mass, medications can be added judiciously with careful attention to comorbid conditions. Metabolic and bariatric surgery is the treatment that can produce the most weight loss, but also carries greater risk than either lifestyle treatments or medications. It is viewed as a viable option given the long lifespans people currently enjoy. Without these efforts, obesity leads to complications, increased morbidity and mortality, compromises in activities of daily living, and increased direct and indirect medical costs.

Resources

U.S. Centers for Disease Control and Prevention: Overweight & Obesity

Obesity Medicine Association: Additional Resources for Obesity Management

Harvard T.H. Chan School of Public Health: Obesity Prevention Source

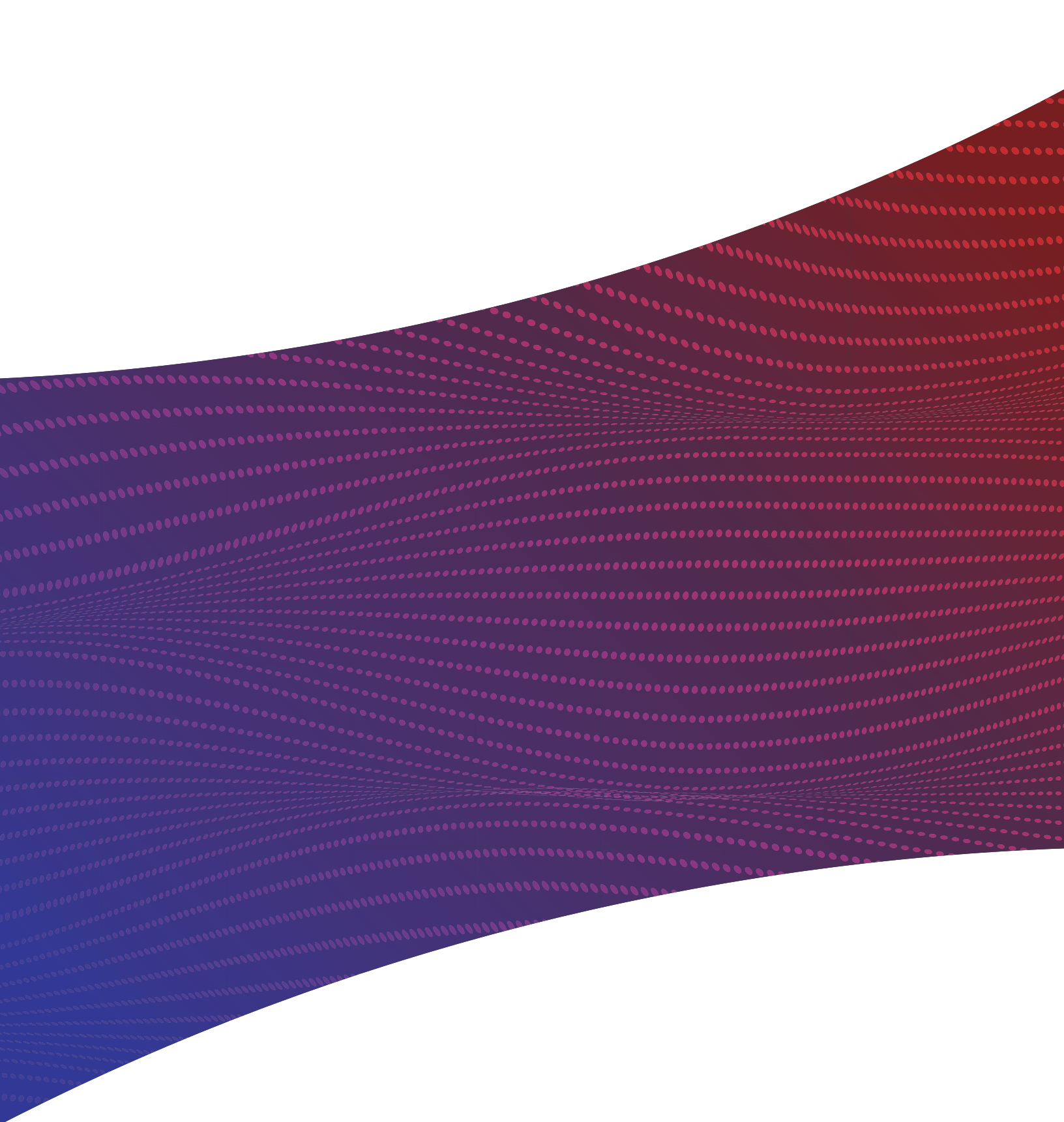
Rethink Obesity: Educational Materials

References

1. Kyle TK, Dhurandhar EJ, Allison DB. Regarding obesity as a disease: evolving policies and their implications. *Endocrinol Metab North Am.* 2016;45(3):511–520. doi: 10.1016/j.ecl.2016.04.004
2. Mechanick JI, Hurley DL, Garvey WT. Adiposity-based chronic disease as a new diagnostic term: the American Association of Clinical Endocrinologists and American College of Endocrinology position statement. *Endocr Pract.* 2017;23(3):372–378. doi: 10.4158/EP161688.PS
3. COVID-19 stats: COVID-19 incidence, by age group — United States, March 1–November 14, 2020. *MMWR Morb Mortal Wkly Rep.* 2021;69(5152):1664. doi: 10.15585/mmwr.mm695152a8
4. Philipose Z, Smati N, Wong CSJ, et al. Obesity, old age, and frailty are the true risk factors for COVID-19 mortality and not chronic disease or ethnicity. *medRxiv.* Preprint, November 18, 2020. doi: <https://www.medrxiv.org/content/10.1101/2020.08.12.20156257v3.full-text>
5. Centers for Disease Control and Prevention. People with certain medical conditions. February 3, 2021. Accessed February 8, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>
6. World Health Organization. Obesity and overweight. April 1, 2020. Accessed January 11, 2021. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
7. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity and severe obesity among adults: United States, 2017–2018. *NCHS Data Brief.* No. 360. Hyattsville, MD: National Center for Health Statistics; 2020.
8. Ward ZJ, Bleich SN, Cradock AL, et al. Projected U.S. state-level prevalence of adult obesity and severe obesity. *N Engl J Med.* 2019;381(25):2440–2450. doi: 10.1056/NEJMsa1909301
9. Ross R, Neeland IJ, Yamashita S, et al. Waist circumference as a vital sign in clinical practice: a consensus statement from the IAS and ICCR Working Group on Visceral Obesity. *Nature Rev Endocrinol.* 2020;16(3):177–189. doi: 10.1038/s41574-019-0310-7
10. Garvey WT, Mechanick JI, Brett EM, et al. American Association of Clinical Endocrinologists and American College of Endocrinology comprehensive clinical practice guidelines for medical care of patients with obesity. *Endocr Pract.* 2016;22(suppl 3):1–203. doi: 10.4158/EP161365.GL
11. Distefano G, Goodpaster BH. Effects of exercise and aging on skeletal muscle. *Cold Spring Harb Perspect Med.* 2018;8(3):a029785. doi: 10.1101/cshperspect.a029785
12. Donohoe KL, Price ET, Gendron TL, Slattum PW. Geriatrics: the aging process in humans and its effects on physiology. In: DiPiro JT, Yee GC, Posey LM, et al., eds. *Pharmacotherapy: A Pathophysiologic Approach.* 11e. New York: McGraw-Hill; 2020: chapter e22.
13. Batsis JA, Villareal DT. Sarcopenic obesity in older adults: aetiology, epidemiology and treatment strategies. *Nat Rev Endocrinol.* 2018;14(9):513–537. doi: 10.1038/s41574-018-0062-9
14. Bales CW, Porter Starr KN. Obesity interventions for older adults: diet as a determinant of physical function. *Adv Nutr.* 2018;9(2):151–159. doi: 10.1093/advances/nmx016

15. Stanford FC, Lee M, Hur C. Race, ethnicity, sex, and obesity: is it time to personalize the scale? *Mayo Clin Proc.* 2019;94(2):362–363. doi: 0.1016/j.mayocp.2018.10.014
16. Weinheimer EM, Sands LP, Campbell WW. A systematic review of the separate and combined effects of energy restriction and exercise on fat-free mass in middle-aged and older adults: implications for sarcopenic obesity. *Nutr Rev.* 2010;68(7):375–388. doi: 10.1111/j.1753-4887.2010.00298.x
17. Zibellini J, Seimon RV, Lee CMY, et al. Does diet-induced weight loss lead to bone loss in overweight or obese adults? A systematic review and meta-analysis of clinical trials. *J Bone Miner Res.* 2015;30(12):2168–2178. doi: 10.1002/jbmr.2564
18. Porter Starr KN, McDonald SR, Bales CW. Obesity and physical frailty in older adults: a scoping review of lifestyle intervention trials. *J Am Med Dir Assoc.* 2014;15(4):240–250. doi: 10.1016/j.jamda.2013.11.008
19. Centers for Disease Control and Prevention. Physical activity recommendations for different age groups. September 17, 2020. Accessed February 8, 2021. <https://www.cdc.gov/physicalactivity/basics/age-chart.html>
20. Villareal DT, Aguirre L, Gurney AB, et al. Aerobic or resistance exercise, or both, in dieting obese older adults. *N Engl J Med.* 2017;376(20):1943–1955. doi: 10.1056/NEJMoa1616338
21. Leigh SJ, Morris MJ. Diet, inflammation and the gut microbiome: mechanisms for obesity-associated cognitive impairment. *Biochim Biophys Acta Mol Basis Dis.* 2020;1866(6):165767. doi: 10.1016/j.bbadis.2020.165767
22. Waalen J. The genetics of human obesity. *Transl Res.* 2014;164(4):293–301. doi: 10.1016/j.trsl.2014.05.010
23. Berthoud H-R. The neurobiology of food intake in an obesogenic environment. *Proc Nutr Soc.* 2012;71(4):478–487. doi: 10.1017/S0029665112000602
24. Hall KD, Ayuketah A, Brychta R, et al. Ultra-processed diets cause excess calorie intake and weight gain: an inpatient randomized controlled trial of ad libitum food intake. *Cell Metab.* 2019;30(1):67–77.e3. doi: 10.1016/j.cmet.2019.05.008
25. Sheehan AH, Chen JT, Yanovski JA. Obesity. In: DiPiro JT, Yee GC, Posey LM, et al., eds. *Pharmacotherapy: A Pathophysiologic Approach*. 11e. New York: McGraw-Hill; 2020: 2531–2553.
26. Stanford FC, Cena H, Biino G, et al. The association between weight-promoting medication use and weight gain in postmenopausal women: findings from the Women's Health Initiative. *Menopause.* 2020;27(10):1117–1125. Doi: 10.1097/GME.0000000000001589
27. Thomas JG, Bond DS, Phelan S, et al. Weight-loss maintenance for 10 years in the National Weight Control Registry. *Am J Prev Med.* 2014;46(1):17–23. doi: 10.1016/j.amepre.2013.08.019
28. Luo J, Hodge A, Hendryx M, Byles JE. Age of obesity onset, cumulative obesity exposure over early adulthood and risk of type 2 diabetes. *Diabetologia.* 2020;63(3):519–527. doi: 0.1007/s00125-019-05058-7
29. Veronese N, Cereda E, Solmi M, et al. Inverse relationship between body mass index and mortality in older nursing home residents: a meta-analysis of 19,538 elderly subjects. *Obes Rev.* 2015;16(11):1001–1015. doi: 10.1111/obr.12309
30. Stanford FC, Tauqeer Z, Kyle TK. Media and its influence on obesity. *Curr Obes Rep.* 2018;7(2):186–192. doi: 10.1007/s13679-018-0304-0
31. University of Connecticut Rudd Center for Food Policy & Obesity. Weight bias & stigma. Accessed February 8, 2021. <https://uconnruddcenter.org/research/weight-bias-stigma/>
32. Hebl MR, Xu J. Weighing the care: physicians' reactions to the size of a patient. *Int J Obes Relat Metab Disord.* 2001;25(8):1246–1252. doi: 10.1038/sj.ijo.0801681
33. Porter Starr KN, Borack M, Lyles K, et al. Bone mineral density and fracture risk in obese older adults 12 months after completion of a 6-month higher protein diet and exercise intervention. *Curr Devel Nutr.* 2020;4(suppl 2):67. doi: 10.1093/cdn/nzaa040_067

34. Armamento-Villareal R, Aguirre L, Waters DL, et al. Effect of aerobic or resistance exercise, or both, on bone mineral density and bone metabolism in obese older adults while dieting: a randomized controlled trial. *J Bone Miner Res.* 2020;35(3):430–439. doi: 10.1002/jbmr.3905
35. Stehr MD, von Lengerke T. Preventing weight gain through exercise and physical activity in the elderly: a systematic review. *Maturitas.* 2012;72(1):13–22. doi: 10.1016/j.maturitas.2012.01.022
36. McLaughlin EC, El-Kotob R, Chaput J-P, et al. Balance and functional training and health in adults: an overview of systematic reviews. *Appl Physiol Nutr Metab.* 2020;45(10 suppl 2):S180–S196. doi: 10.1139/apnm-2020-0279
37. Khara R, Murad MH, Chandar AK, et al. Association of pharmacological treatments for obesity with weight loss and adverse events: a systematic review and meta-analysis. *JAMA.* 2016;315(22):2424–2434. doi: 10.1001/jama.20167602
38. Stanford FC, Toth AT, Shukla AP, et al. Weight loss medications in older adults after bariatric surgery for weight regain or inadequate weight loss: a multicenter study. *Bariatric Surg Pract Patient Care.* 2018;13(4):171–178. doi: 10.1089/bari.2018.0037
39. Saxon DR, Iwamoto SJ, Mettenbrink CJ, et al. Antiobesity medication use in 2.2 million adults across eight large health care organizations: 2009–2015. *Obesity (Silver Spring).* 2019;27(12):1975–1981. doi: 10.1002/oby.22581
40. Novo Nordisk. Novo Nordisk files for US FDA regulatory approval of once-weekly semaglutide 2.4 mg for weight management. December 4, 2020. Accessed February 9, 2021. <https://www.novonordisk.com/content/nncorp/global/en/news-and-media/news-and-ir-materials/news-details.html?id=37551>
41. Wilding JPH, Batterham RL, Calanna S, et al. Once-weekly semaglutide in adults with overweight or obesity. *N Engl J Med.* Epub in advance of print, February 10, 2021. doi: 10.1056/NEJMoa2032183
42. Ingelfinger JR, Rosen CJ. STEP 1 for effective weight control – another first step? *N Engl J Med.* Epub in advance of print, February 10, 2021. doi: 10.1056/NEJMe2101705
43. Susmallian S, Raziell A, Barnea R, Paran H. Bariatric surgery in older adults: should there be an age limit? *Medicine (Baltimore).* 2019;98(3):e13824. doi: 10.1097/MD.00000000000013824
44. Giordano S, Victorzon M. Bariatric surgery in elderly patients: a systematic review. *Clin Interv Aging.* 2015;10:1627–1635. doi: 10.2147/CIA.S70313
45. Batsis JA, Dolkart KM. Evaluation of older adults with obesity for bariatric surgery: geriatricians' perspective. *J Clin Gerontol Geriatr.* 2015;6(2):45–53. doi: 10.1016/j.jcgg.2015.01.001



www.geron.org