Weight Management

Chapter 14

Table 14.1 Weight of Americans Aged 20 and Older, 2011–2014

GROUP	PERCENT OBESE
Both sexes	37.8*
All races, male	34.3
All races, female	38.3
Non-Hispanic white, male	33.6
Non-Hispanic white, female	35.5
Non-Hispanic black, male	37.5
Non-Hispanic black, female	56.9
Hispanic, male	39.0
Hispanic, female	45.7

* Data from 2013–2014 only.

SOURCES: National Center for Health Statistics. 2016. Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities. Hyattsville, MD: National Center for Health Statistics. Ogden, C., et al. 2015. Prevalence of Obesity Among Adults and Youth: United States, 2011–2014. NCHS Data Brief No. 219. (http://www.cdc.gov/nchs/products/databriefs/db219.htm).

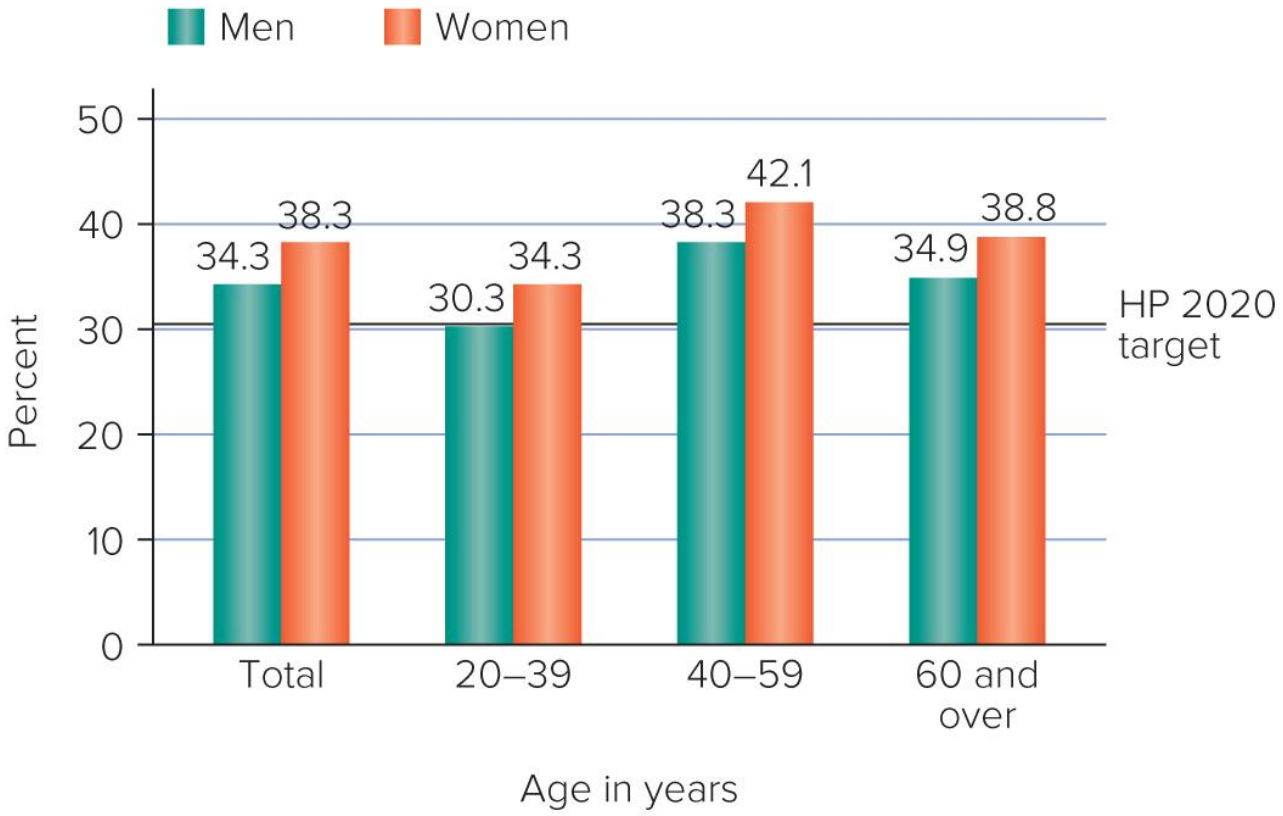


Figure 14.1 Prevalence of Obesity in American Adults, by Sex and Age, 2011–2014

The government's Healthy People 2020 initiative has set a target to reduce the proportion of adults who are obese from current levels down to 30.5%.

SOURCE: Ogden, C., et al. 2015. Prevalence of Obesity Among Adults and Youth: United States, 2011–2014. NCHS Data Brief No. 219. (http://www .cdc.gov/nchs/products/databriefs/db219.htm).

Evaluating Body Weight and Body Composition

- Body composition

  Bodies are composed of fat-free mass and body fat

  Fat-free mass: non-fat tissues

  Body fat includes:

  - Essential fat
  - Fat stored in fat cells (adipose tissue)
  - Fat located in subcutaneous fat (under the skin) and around major organs (visceral fat)

- Percent body fat: the proportion of the body's total weight that is fat

Defining Healthy Weight, Overweight, and Obesity

- Is your body at a healthy weight?
  - Overweight
  - Obesity
- Several methods are used to evaluate body weight and percent body fat
  - Body composition
  - Body mass index (BMI)
  - Body fat distribution

Estimating Body Composition

- Bioelectrical impedance analysis (BIA)
- Skinfold measurement
- Hydrostatic weighing
- The Bod Pod
- Scanning procedures
    - CT scan
    - MRI
    - Dual-energy X-ray absorptiometry (DEXA)
    - Dual-photon absorptiometry

Body Mass Index

- Body mass index (BMI) is useful for classifying the health risks of body weight
    - Correlated with but does not directly measure body fat
- Body weight (in kilograms) divided by the square of height (in meters)
    - Alternatively, the weight in pounds divided by the square of height in inches, multiplied by 703 (the conversion factor)

Body Mass Index (2)

- Standards set by the NIH:
  - Between 18.5 and 24.9 is healthy
  - Greater than 25 is overweight
  - Greater than 30 is obese
  - Under 17.5 is sometimes used as a diagnostic criterion for anorexia nervosa
- BMI is not helpful for determining body composition because it does not distinguish between fat weight and fat-free weight
  - Can be inaccurate for shorter people, muscular athletes, and older adults

Table 14.2 Body Mass Index (BMI) Classification and Disease Risk

CLASSIFICATION OBESITY CLASS	BMI (KG/M^2)	OBESITY CLASS	DISEASE RISK RELATIVE TO NORMAL WEIGHT AND WAIST CIRCUMFERENCE [a] MEN ≤40 IN. (102 CM) WOMEN ≤35 IN. (88 CM)	DISEASE RISK RELATIVE TO NORMAL WEIGHT AND WAIST CIRCUMFERENCE MEN >40 IN. (102 CM) WOMEN >35 IN. (88 CM)
Underweight [b]	<18.5	n/a	n/a	n/a
Normal [c]	18.5–24.9	n/a	n/a	n/a
Overweight	25.0–29.9	n/a	Increased	High
Obese	30.0–34.9	I	High	Very high
Obese	35.0–39.9	II	Very high	Very high
Extreme obesity	≥40.0	III	Extremely high	Extremely high

[a] Disease risk for type 2 diabetes, hypertension, and cardiovascular disease. The waist circumference cutoff points for increased risk are 40 inches (102 cm) for men and 35 inches (88 cm) for women.

[b] Research suggests that a low BMI can be healthy in some cases, as long as it is not the result of smoking, an eating disorder, or an underlying disease process. A BMI of 17.5 or less is sometimes used as a diagnostic criterion for the eating disorder anorexia nervosa.

[c] Increased waist circumference can also be a marker for increased risk, even in people of normal weight.

SOURCE: Adapted from National Heart, Lung, and Blood Institute. 1998. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report. Bethesda, MD: National Institutes of Health; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. About BMI for Adults (http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html#Athlete); National Heart, Lung, and Blood Institute. Assessing Your Weight and Health Risk (http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/risk.htm)

Body Fat Distribution

- Important to consider how fat is distributed throughout your body
  - Waist circumference
  - Waist-to-hip ratio
  - Apple shape: android obesity
    - Upper regions of the body, particularly abdomen
    - Increased risk of high blood pressure, diabetes, early-onset heart disease, stroke, and cancer
  - Pear shape: gynoid obesity
    - Fat storage in the hips, buttocks, and thighs

What Is the Right Weight for You?

- Body weight and body shape are influenced by heredity
- Changes should be lifestyle changes
- Let a healthy lifestyle determine your weight

Body Fat and Wellness

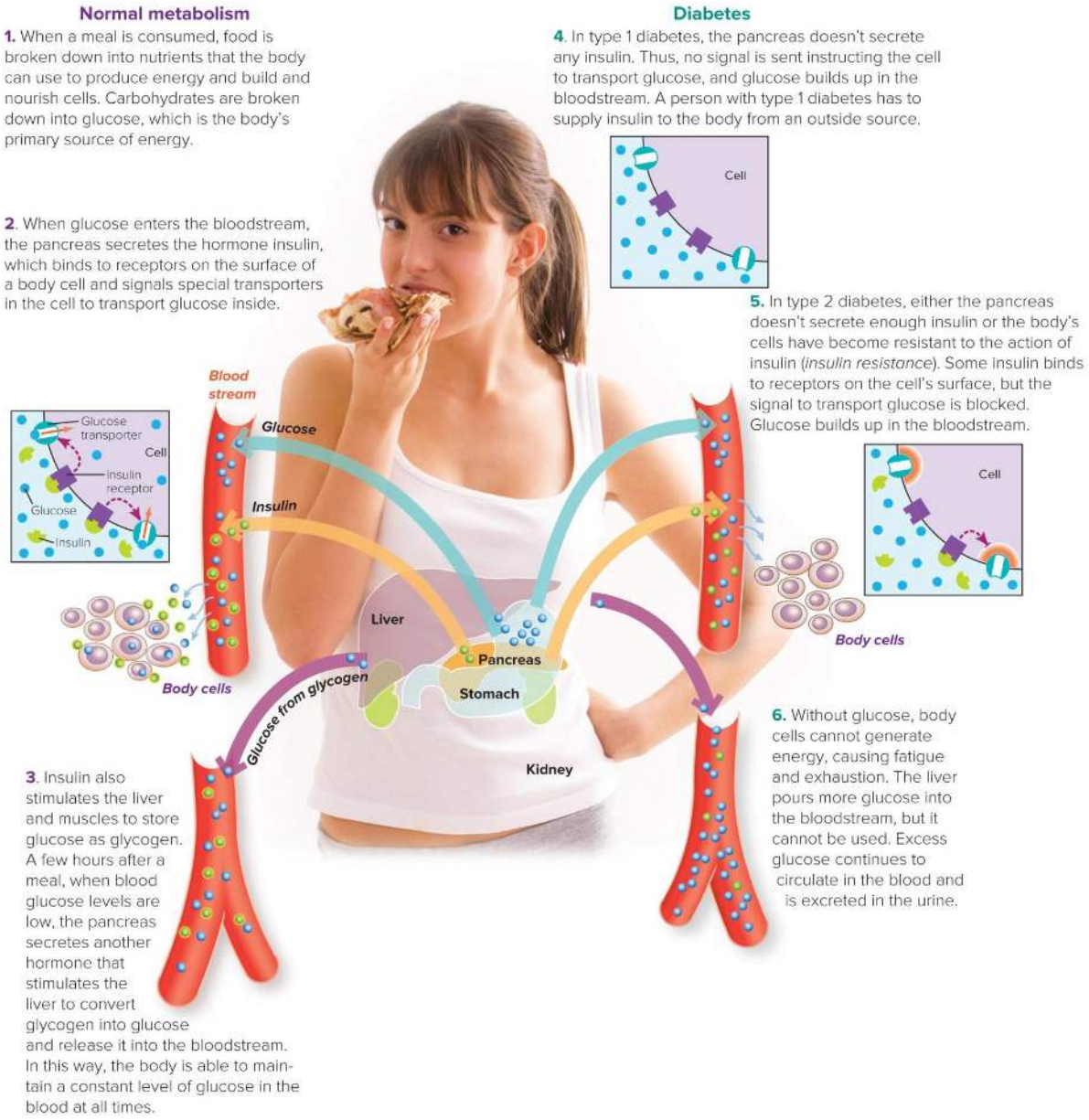
- Obesity doubles mortality rates and can reduce life expectancy by 10–20 years
- Obesity is associated with a number of chronic conditions
  - Diabetes, cardiovascular disease, and many others
  - Also associated with complications of pregnancy, psychological disorders, and increased surgical risk
- Modest weight loss results in psychological improvements and improved quality of life for many

Diabetes

- Diabetes mellitus causes a disruption of normal metabolism
  - Type 1 diabetes
    - Immune system destroys insulin-producing cells in the pancreas
  - Type 2 diabetes
    - Strongly associated with excess body fat
    - Pancreas does not produce enough insulin, body cells have become resistant, or both
  - Gestational diabetes
  - Prediabetes

Figure 14.3
Diabetes Mellitus

During digestion, carbohydrates are broken down in the small intestine into glucose, a simple sugar that enters the bloodstream. The presence of glucose signals the pancreas to release insulin, a hormone that helps cells take up glucose; once inside a cell, glucose can be converted to energy.



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Heart Disease and Other Chronic Conditions

- Overweight and obesity are risk factors for:
  - Heart disease
    - Hypertension
    - Unhealthy levels of cholesterol and triglycerides
    - Impaired heart function
  - Metabolic syndrome
  - Certain types of cancer

Problems Associated with Very Low Levels of Body Fat

- Low levels of body fat are a threat to wellness
  - Reproductive, circulatory, and immune system disorders
- Extremely lean people are more likely to suffer from dangerous eating disorders
- Female athlete triad:
  - Abnormal eating patterns (and excessive exercising)
  - Amenorrhea
  - Decreased bone density

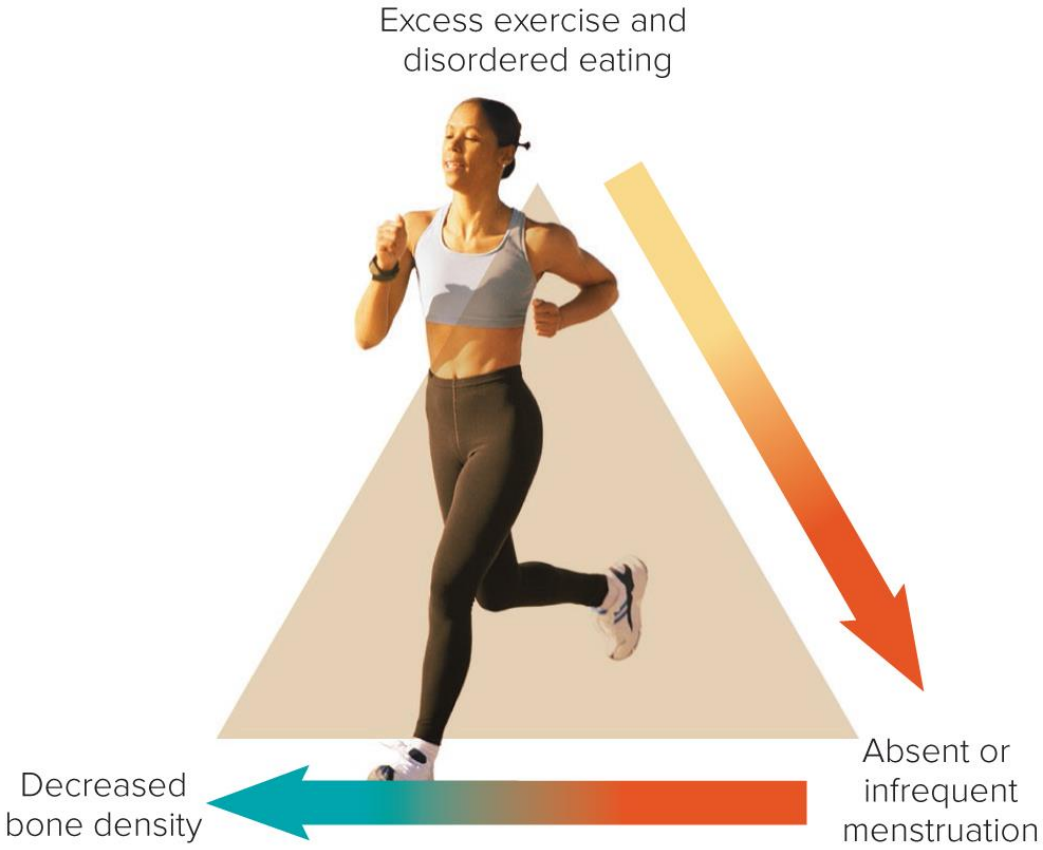

Figure 14.4 Female Athlete Triad

Some girls and women striving for unrealistic thinness develop a condition called the female athlete triad. Disordered eating combined with intense exercise can suppress the hormones that control the menstrual cycle, and absence of menstrual periods can lead to osteoporosis.

Factors Contributing to Excess Body Fat

- Energy balance is key to maintaining healthy body weight and keeping a healthy ratio of fat to fat-free mass

  Body takes in energy (calories) and uses energy (calories) to maintain vital body functions

  To change weight, the balance must be tipped
  - Positive energy balance
  - Negative energy balance

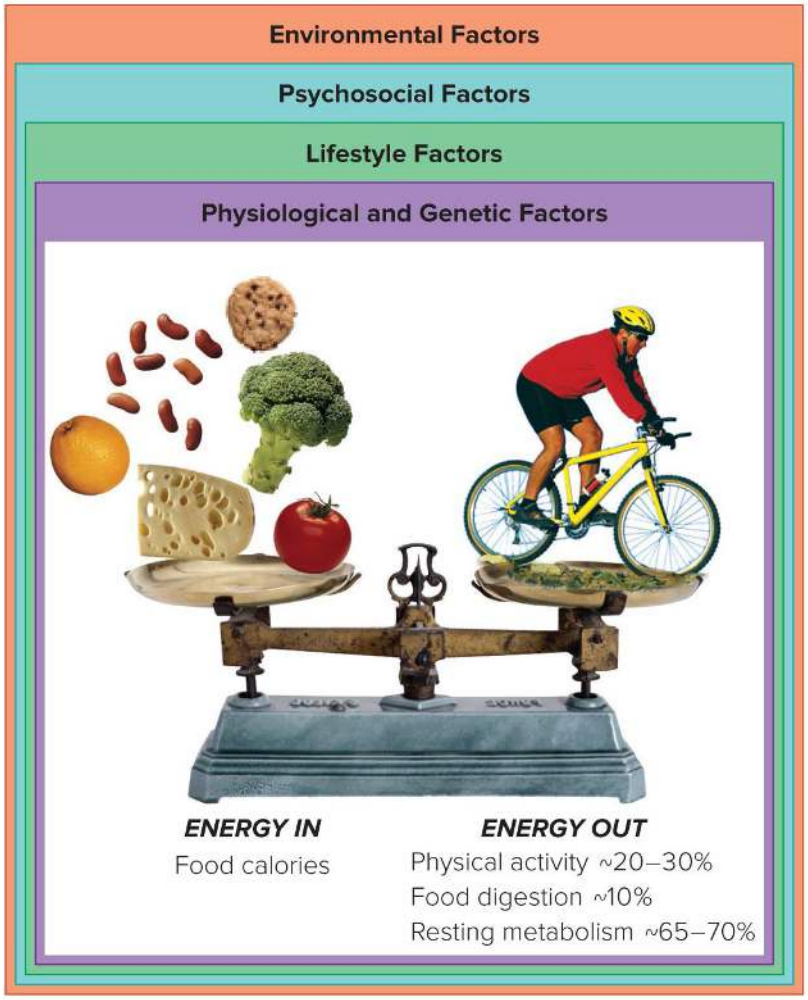

Figure 14.5
The Energy Balance Equation

Body weight remains constant if the number of calories consumed equals the number of calories expended. Many factors influence components of the energy balance equation, some of which are out of an individual's control. Consider environmental factors; psychosocial factors; lifestyle factors; and physiological and genetic factors.

Factors Contributing to Excess Body Fat (2)

- Genetic factors

  Nutrigenomics: study of how genes and nutrients interact

  Genetics contribute to 25–40% of an individual's body fat, but one's environment is still important

  Set point theory suggests our bodies are designed to maintain a stable "set point"

  – Set point can change if changes in activity and diet are maintained over a long time

Factors Contributing to Excess Body Fat (3)

- Physiological factors
  - Metabolism
    - Resting metabolic rate (RMR) accounts for about 65–70% of daily energy expenditure
    - Genetics, behavior, and weight loss or gain affect metabolic rate
  - Hormones
  - Fat cells
  - Gut microbia

Factors Contributing to Excess Body Fat (4)

- Lifestyle factors
  - Eating habits
  - Physical activity
  - Sleep
- Psychosocial factors
  - Food as a means of coping with stress and negative emotions
  - Obesity is strongly associated with socioeconomic status
  - Foods within your family and culture

Factors Contributing to Excess Body Fat (5)

- Environmental factors

  Americans live and work in an "obesogenic" environment

  - Food marketing and pricing
  - Food production and distribution
  - National agricultural policies

  Price and availability can have a profound affect on food choices

Adopting a Healthy Lifestyle for Successful Weight Management

- Slow weight gain is a major cause of overweight and obesity
- Dietary patterns and eating habits
  - Dietary Guidelines for Americans; MyPlate; DASH
  - Pay attention to total calories
    - To maintain weight, calories consume must equal calories expended
  - Pay attention to portion sizes
  - Replace energy-dense foods with nutrient-dense foods
  - Eat regular, balanced meals

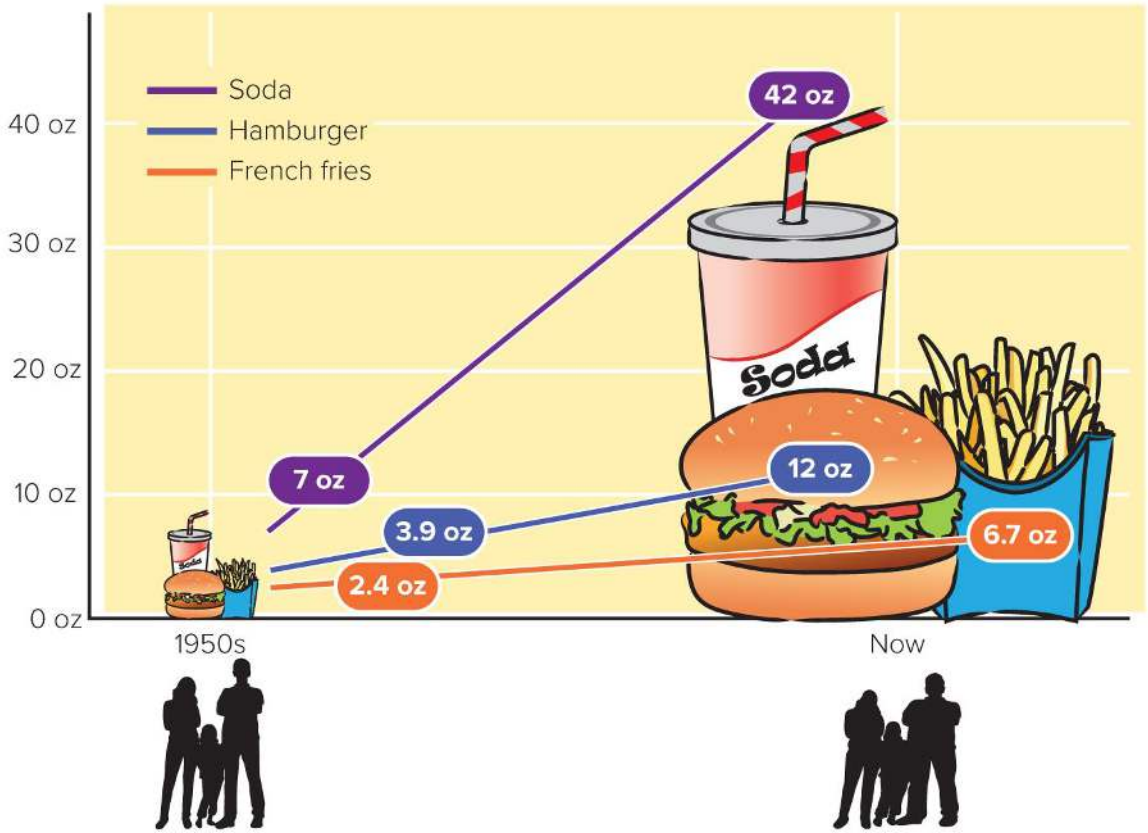

Figure 14.6 The New (Ab)normal

Portion sizes have been growing. So have we. The average restaurant meal today is more than four times larger than in the 1950s. Adults today are, on average, 26 pounds heavier. To become healthier eaters, there are things we can do for ourselves and our community. Order the smaller meals on the menu, split a meal with a friend, or eat half and take the rest home. Ask the managers at favorite restaurants to offer smaller meals.

SOURCE: Centers for Disease Control and Prevention; for more information, visit http://MakingHealthEasier.org/TimeToScaleBack.

Table 14.3 Examples of Foods Low in Energy Density

FOOD	AMOUNT	CALORIES
Carrot, raw	1 medium	25
Popcorn, air popped	2 cups	62
Apple 1	1 medium	72
Vegetable soup	1 cup	72
Plain oatmeal	½ cup	80
Fresh blueberries	1 cup	80
Corn on the cob (plain)	1 ear	80
Cantaloupe	½ melon	95
Light (fat-free) yogurt with fruit	6 oz.	100
Unsweetened applesauce	1 cup	100
Pear	1 medium	100

Adopting a Healthy Lifestyle for Successful Weight Management (2)

- Physical activity and exercise

  Burns calories

  Positive effects on metabolism
  - Increased muscle mass

  Improves cardiovascular and respiratory health

  Enhances mood, sleep, self-esteem, and one's sense of accomplishment

Adopting a Healthy Lifestyle for Successful Weight Management (3)

- Thinking and emotions

  Weight problems are associated with low self-esteem and negative emotions

  - "Ideal self"
  - Self-talk can be self-deprecating or positively motivating

- Coping strategies

  Develop appropriate coping strategies to deal with the stresses of life

  - Analyze your eating habits with fresh eyes

Approaches to Overcoming a Weight Problem

- Doing it yourself
  - Set reasonable goals
    - Loss of 0.5–2.0 pounds per week recommended
  - Develop a plan you can stick with
- Diet books
  - Reject gimmicks or rotating levels of calories
  - Seek books that advocate a balanced approach
- Dietary supplements and diet aids
  - Formula drinks and food bars, herbal supplements, and others: claims are often false

Approaches to Overcoming a Weight Problem (2)

- Weight loss programs
  - Noncommercial: TOPS (Take Off Pounds Sensibly); OA (Overeaters Anonymous)
  - Commercial: Weight Watchers
  - Commitment and a plan for maintenance are important
  - Online
  - Clinical: medically supervised

Approaches to Overcoming a Weight Problem (3)

- Prescription drugs
  - Appetite suppressants
  - All have potential side effects
  - Work best in conjunction with behavior modification
  - Once drugs are stopped, most individuals return to their original heavy weight
  - Good option for the very obese who need help getting started

Table 14.4 Safety and Effectiveness of Common Over-the-Counter Weight Loss Pills

INGREDIENT	PROPOSED MECHANISM OF ACTION	EVIDENCE OF EFFICACY REPORTED	ADVERSE EFFECTS
Alli (OTC form of orlistat)	Decreases absorption of dietary fat	Possible modest benefit; less effective than prescription strength form (Xenical)	Loose stools, gas with oily spotting, more frequent and hard to control bowel movements; reduced absorption of some nutrients; rare cases of liver damage
Bitter orange (synephrine)	Increased energy expenditure, mild appetite suppressant	Possible effect on resting metabolic rate; inconclusive effects on weight loss	Chest pain, anxiety, increased blood pressure and heart rate
Caffeine (as added caffeine or from guarana, kola nut, yerba mate, or other herbs)	Stimulates central nervous system, increases fat oxidation	Possible modest effect on body weight or decreased weight gain over time	Nervousness, jitteriness, vomiting, and tachycardia
Chitosan	Binds dietary fat in the digestive tract	Minimal effect on body weight	Bloating, flatulence, indigestion, constipation, nausea, heartburn
Chromium	Increases lean muscle mass; promotes fat loss; reduced hunger and fat cravings	Minimal effect on body weight and body fat	Headache, watery stools, constipation, weakness, vertigo, nausea, vomiting, hives

SOURCE: Adapted from National instates of Health: Office of Dietary Supplements 2015. Dietary Supplements for Weight Loss: Fact Sheet for Health Professionals, http://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional.

Table 14.4 Safety and Effectiveness of Common Over-the-Counter Weight Loss Pills (2)

INGREDIENT	PROPOSED MECHANISM OF ACTION	EVIDENCE OF EFFICACY REPORTED	ADVERSE EFFECTS
Conjugated linoleic acid	Promotes reduction in fat cells	Minimal effect on body weight and body fat	Abdominal pain, constipation, diarrhea, indigestion, and (possibly) adverse effects on blood lipid levels
Green tea extract	Increases energy expenditure and fat use, reduces fat absorption	Possible modest effect on body weight	Abdominal pain, constipation, nausea, increased blood pressure, liver damage
Guar gum	Acts as bulking agent in the gut, increases feelings of fullness	No effect on body weight	Abdominal pain, flatulence, diarrhea, nausea, cramps
Hoodia	Suppresses appetite, reduces food intake	Limited research, but no apparent effect on energy intake or body weight	Headache, dizziness, nausea, and vomiting
Pyruate	Increases fat burning and energy expenditure	Possible minimal effect on body weight and body fat	Diarrhea, gas, bloating, and (possibly) decreased "good" cholesterol (HDL).
Raspberry ketone	Alters fat metabolism	Insufficient research to draw firm conclusions	None known

SOURCE: Adapted from National instates of Health: Office of Dietary Supplements 2015. Dietary Supplements for Weight Loss: Fact Sheet for Health Professionals, http://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional.

Approaches to Overcoming a Weight Problem (4)

- Surgery

  Severe obesity is a medical condition

  - NIH recommends gastric bypass for individuals with a BMI of 40,
    or greater than 35 with an obesity-related illness

  Three common bariatric surgeries:

  - Roux-en-Y gastric bypass
  - Vertical sleeve gastrectomy
  - Lap-Band (adjustable banding procedure)

  Liposuction: cosmetic procedure only

Body Image and Eating Disorders

- Perceptions, images, thoughts, attitudes, and emotions
- Severe body image problems:
  - Body dysmorphic disorder (BDD)
    - Constant preoccupation with body imperfections
    - Related to obsessive-compulsive disorder
  - Muscle dysmorphia

Body Image and Eating Disorders (2)

- Eating disorders are psychological disorders, characterized by severe disturbances in body image, eating patterns, and eating-related behaviors
  - Anorexia
  - Bulimia
  - Binge-eating disorder
- Heredity and environment both play roles, as do turning points in life
  - Coping with stresses

Anorexia Nervosa

- Failure to eat enough food to maintain a reasonable body weight
- Characteristics:
  - Fear of gaining weight or becoming fat
  - Distorted self-image
  - Compulsive behaviors and rituals
  - Excessive exercise

Anorexia Nervosa (2)

- Health risks of anorexia nervosa:
  - Amenorrhea
  - Cold intolerance
  - Low blood pressure and heart rate
  - Dry skin, and swelling of the hands and feet
  - Depression and suicide
  - Medical complications
    - Disorders of the cardiovascular, gastrointestinal, endocrine, and skeletal systems

Bulimia Nervosa

- Recurring episodes of binge eating followed by purging
- Characteristics:

  Rapid consumption of food, followed by purging

  Eating in secret

  After a binge, feeling ashamed, disgusted, and physically and emotional drained

Bulimia Nervosa (2)

- Health risks of bulimia nervosa:
  - Eroded tooth enamel
  - Deficient calorie intake
  - Liver and kidney damage
  - Cardiac arrhythmia
  - Chronic hoarseness
  - Esophageal tearing
  - Rupture of the stomach
  - Menstrual problems
  - Depression

Binge-Eating Disorder

- Uncontrollable eating followed by feelings of guilt and shame about weight gain
  - Characterized by very rapid eating, eating until uncomfortably full, eating when not hungry, and preferring to eat alone
- Often, eating is a way of coping
- Likely to be obese
- High rates of depression and anxiety

Other Patterns of Disordered Eating

- Feeding or eating disorders that do not meet the diagnostic criteria for anorexia, bulimia, or binge-eating disorder may be classified as other specified feeding or eating disorders (OSFED)
  - Excessive dieting
  - Occasional binging and purging
  - Inability to control eating

Treating Eating Disorders

- Must address eating behaviors and misuse of food to manage stress and emotions
- Psychotherapy and medical management

  Anorexia nervosa: averting a medical crisis

  – Adequate body weight; psychological aspects

  Bulimia nervosa and binge-eating disorder: stabilizing the eating patterns

  – Identifying and changing the patterns of thinking

  – Improving coping skills

Positive Body Image: Finding Balance

- Knowing when you've reached the limits of healthy change is crucial
- Weight management must take place in a positive and realistic atmosphere

Review

- Discuss methods for assessing body weight and body composition
- Explain the effects of body fat on wellness
- Explain factors that contribute to excess body fat
- Describe lifestyle factors associated with successful weight management
- Name and describe approaches to overcoming a weight problem
- Explain the relationship between body image and eating disorders and the associated health risks

Long image descriptions

APPENDIX A

Figure 14.3 Diabetes Mellitus Appendix

1. In normal metabolism, when a meal is consumed, food is broken down into nutrients that the body can use to produce energy and build and nourish cells. Carbohydrates are broken down into glucose, which is the body's primary source of energy.
2. When glucose enters the bloodstream, the pancreas secretes the hormone insulin, which binds to receptors on the surface of a body cell and signals special transporters in the cell to transport glucose inside.
3. Insulin also stimulates the liver and muscles to store glucose as glycogen. A few hours after a meal, when blood glucose levels are low, the pancreas secretes another hormone that stimulates the liver to convert glycogen into glucose and release it into the bloodstream. In this way, the body is able to maintain a constant level of glucose in the blood at all times.
4. In type 1 diabetes, the pancreas doesn't secrete any insulin. Thus, no signal is sent instructing the cell to transport glucose, and glucose builds up in the bloodstream. A person with type 1 diabetes has to supply insulin to the body from an outside source.
5. In type 2 diabetes, either the pancreas doesn't secrete enough insulin or the body's cells have become resistant to the action of insulin (insulin resistance). Some insulin binds to receptors on the cell's surface, but the signal to transport glucose is blocked. Glucose builds up in the bloodstream.
6. Without glucose, body cells cannot generate energy, causing fatigue and exhaustion. The liver pours more glucose into the bloodstream, but it cannot be used. Excess glucose continues to circulate in the blood and is excreted in the urine.

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