Body Weight and Body Composition

Chapter 7
Prevalence of Self-Reported Obesity* Among U.S. Adults, 2012

- 20–<25%
- 25–<30%
- 30–<35%

*Obesity: BMI ≥ 30, or about 30 pounds overweight for a 5’4” person.
What Is a Healthy Body Weight?

- There is no ideal body weight for each person, but there are ranges for a healthy body weight.

- A healthy body weight is defined as:
  - Acceptable Body Mass Index (BMI)
  - Fat distribution that is not a risk factor for illness
  - Absence of any medical conditions that would suggest the need for weight loss
Body Mass Index

- BMI is a measure of body weight in relation to height
- There appears to be a U-shaped relationship between BMI and risk of death

<table>
<thead>
<tr>
<th>BMI Category</th>
<th>Range</th>
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<tbody>
<tr>
<td>Underweight</td>
<td>Less than 18.5</td>
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<tr>
<td>Healthy weight</td>
<td>18.5 to 24.9</td>
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<td>Overweight</td>
<td>25 to 29.9</td>
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<td>Obese</td>
<td>≥ 30</td>
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BMI formula:

\[ BMI = \frac{\text{weight in kg}}{(\text{height in meters})^2} \text{ OR } \frac{\text{weight in pounds}}{(\text{height in inches})^2 \times 703} \]
Body Mass Index

- BMI may incorrectly estimate risk for some people
  - Those with muscular build, BMI may overestimate body fat
  - The elderly or others with low muscle mass, BMI may underestimate body fat
# Body Mass Index (BMI)

Table 7.1: Body Mass Index (BMI)

Find your height in the left-hand column and look across the row until you find the number that is closest to your weight. The number at the top of that column identifies your BMI. The darkest shaded area represents healthy weight ranges.

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Underweight (<18.5) | Healthy Weight (18.5-24.9) | Overweight (25-29.9) | Obese (≥30)

Source: Adapted from “Body Mass Index Table,” National Heart, Lung, and Blood Institute, retrieved from www.nhlbi.nih.gov/guidelines/obesity/bmi_tbl.htm.
Body Fat Percentage

- Different groups have different body fat expectations
  - Healthy range for a typical male is 8 to 24 percent; athletes 5 to 10 percent
  - Healthy range for a typical female is 21 to 35 percent; athletes 15 to 20 percent
  - Below a certain body fat threshold, hormones cannot be produced and health problems can occur

- Body fat percentage can be measured by:
  - Immersion (most accurate); X-ray; skinfold measurement; bioelectrical impedance
Body Fat Distribution

- Where you carry your body fat is important in determining your health risk
  - A large abdominal circumference is associated with high cholesterol levels and higher risk for heart disease, stroke, diabetes, and hypertension
  - Obese men tend to accumulate abdominal fat
  - Obese women tend to accumulate hip and thigh fat; however, the onset of menopause shifts weight gain to the abdomen
- If your BMI is in the healthy range, a large waist circumference may signify an independent risk for disease
Waist to Hip Ratio (WHR)
Issues Related to Overweight and Obesity

- Obese people are four times more likely to die before reaching expected lifespan and have increased risk for:
  - High blood pressure
  - Diabetes
  - Elevated cholesterol
  - Coronary heart disease
  - Stroke
  - Gall bladder disease
  - Osteoarthritis
  - Sleep apnea
  - Lung problems
  - Certain cancers (uterine, prostate, and colorectal)
Risks of Obesity

Cancer:
- Breast
- Ovary
- Cervix
- Endometrium (women)
- Esophagus
- Kidney
- Gallbladder
- Non-Hodgkin's disease
- Stomach
- Colorectal
- Prostate (men)
- Type 2 diabetes
- High blood cholesterol
- High blood pressure

Daytime sleepiness/Sleep apnea
- Impaired breathing
- Heart disease
- Pancreatitis
- Kidney disease
- Liver disease
- Gallbladder disease
- Carpal tunnel syndrome
- Low back pain
- Pain
- Urinary stress incontinence
- Surgical complications
- Infections following wounds
- Infertility
- Impaired immunity
- Osteoarthritis
- Gout

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Diabetes and Obesity

- The rates of obesity and diabetes in the U.S. have risen in parallel.
- 90 to 95 percent of people with diabetes have Type-2, the form strongly associated with obesity.
- Approximately 80 percent of American youth with Type-2 diabetes are obese.
- A reduction in body weight by 7 percent through diet and exercise will reduce the risk of developing diabetes by 58 percent.
Number (in Millions) of Civilian, Non-Institutionalized Persons with Diagnosed Diabetes, United States, 1980-2014 – CDC Data

Discrimination and Obesity

- Overweight children are sometimes teased or bullied; weight-related bullying does not stop when you reach adulthood
  - The overweight face discrimination in hiring practices, lower wages, and social stigma
  - A recent study found the overall, tangible cost of obesity for a woman was $4,879 per year, and for a man, $2,646
The Problem of Underweight

» A sudden, unintentional weight loss without a change in diet or exercise level may signify an underlying illness and should prompt a visit to a physician.

» Some individuals have difficulty keeping weight on, and to gain weight, you need to change your energy balance.

- Eating more frequent and energy-dense meals
- Add nutritional supplements as snacks
- Reduce aerobic exercise and increase resistance or weight training.
What Factors Influence Your Weight?

- Many factors contribute to this trend, both individual and environmental
  - Genetic and hormonal influences
  - Age and gender
  - Obesogenic environments (food choices, eating out, larger portions)
  - Lifestyle influences on weight
  - Social networks
  - Dieting and obesity
Genetic and Hormonal Influences

- Your risk of becoming obese if both your parents are obese is 80 percent
- Twin studies suggest genetic tendency toward obesity
  - Except in rare cases of a single gene mutation, genetics alone does not fully explain obesity
- Two dozen hormones thus far identified play a role in appetite and energy expenditure
Genetic and Hormonal Influences

- Stress response affects eating patterns
- In response to stress, our bodies release adrenaline and cortisol, and fat cells release fatty acids and triglycerides in response
  - Chronic stress increases the amount of fat deposited in the abdomen
  - Stress also affects eating patterns; adrenaline will suppress the appetite, but cortisol stimulates it
- The thyroid gland controls much of your metabolic rate through hormone production
  - When it is overactive, weight loss will likely result
  - When it is not active enough, weight gain will likely result
Age and Gender

- Poor childhood eating habits are believed to be a major cause of the recent surge in overweight and obesity.

- Healthy body fat percentage changes as we age: children—12 percent; male adults—15 percent; female adults—25 percent.

- Between the ages of 20 and 40, both men and women gain weight.

- Older adults are susceptible to weight gain and need to be attentive to their lifestyle in order to maintain a healthy weight.
Obesogenic Environments and Lifestyle

- Our chances of becoming obese are significantly influenced by our environment.
- Choice in food is driven by exposure, and cost and convenience.
  - In general, unhealthy foods are more convenient and less expensive than healthy foods.
- Eating out has become a part of daily life.
  - These foods tend to be higher in fat and calories and lower in fiber than a home-cooked meal.
- When confronted with large serving sizes, people eat more and don’t realize it.
Portion Sizes

- 1/2 cup: fruit, vegetables, pasta, or rice
- 1 cup: milk, yogurt, or chopped fresh greens
- 3 oz.: meat, poultry, or fish
- 2 tbs.: salad dressing, oil, butter
- 1 oz.: cheese
Obesogenic Environments and Lifestyle

- The car, TV, and computer all improve our lives but have led to unhealthy habits
  - 25 percent of short trips are taken by car versus riding a bike or walking
  - Americans watch an average of 5 hours of TV a day
- If you are sedentary 23.5 hours a day, your 30 minutes of exercise isn’t going to reverse the negatives
- If your friends gain weight, you are more likely to gain weight
- Less sleep is associated with weight gain in young adults
Obesogenic Environments and Lifestyle

- Yo-yo dieting (weight cycling) contributes to the obesity trend
  - People may lose weight initially, but most find it difficult to maintain the harsh restrictions
  - They rapidly gain back the weight and sometimes gain even more
The Key to Weight Control: Energy Balance

- Energy balance: the relationship between caloric intake (in the form of food) and caloric output (in the form of metabolism and activity)
- If you take in more calories than you use through metabolism and movement (positive energy balance), you store these extra calories as body fat
- If you take in fewer calories than you need (negative energy balance), you draw on body fat stores to provide energy
https://youtu.be/C8ialLlcdcw
Estimating Your Daily Energy Requirements

- **The thermic effect of food**: an estimate of the energy required to process the food
  - Estimated at 10 percent of energy intake
- **Basal metabolic rate (BMR)**: The rate at which the body uses energy to maintain basic life functions, such as digestion, respiration, and temperature regulation
  - About 60 to 70 percent of energy consumed
- Between 10 and 30 percent of the calories consumed each day are used for physical activity
Estimating Your Daily Energy Requirements

- You can estimate your daily energy expenditure by considering (1) the thermic effect of food, (2) the energy spent on basal metabolic rate, and (3) the energy spent on physical activities.
Adjusting Your Caloric Intake

- Reasonable weight loss of 1 pound to 2 pounds per week is a healthy goal.
- A pound of body fat stores 3,500 calories.
  - To lose 1 pound in a week, you need to decrease your total intake for the week by that 3,500 calories.
- Weight loss beyond these guidelines tends to include loss of lean tissue and a decrease in basal metabolic rate.
- Foods high in complex carbohydrates have a greater thermic effect and take more energy to process than high fat foods.
Class Activity

Does The Biggest Loser Support Health Changes or Promote Stigma?
The Diet Industry

- The diet industry effectively caters to people who are looking for “fast” weight loss
  - The diet industry takes in about $61 billion a year
- The concept of fad diets has been around for decades, promising quick weight loss with minimal effort
- Many dietitians and physicians are critical of fad diets and encourage more balanced options and self-monitoring concepts
The Diet Industry

- Weight management organizations offer group support, nutrition education, dietary advice, exercise counseling, and other services
  - Weight Watchers: a commercial program
  - Take Off Pounds Sensibly (TOPS): a free program providing group support; focuses on teaching
  - Overeaters Anonymous: a free program providing group support; more suitable for binge eaters or others with emotional issues related to weight
<table>
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<tr>
<th>Diet/Organization</th>
<th>Theory</th>
<th>Pros and Cons</th>
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<tbody>
<tr>
<td>Volumetrics (self-help book)</td>
<td>Focus on low-energy-dense foods (vegetables, soup broth, nonfat milk) in place of high-energy-dense foods (chips, cookies, candy, nuts, oils)</td>
<td>Includes physical activity&lt;br&gt;Emphasis on lifelong eating patterns&lt;br&gt;Low drop-out rate*&lt;br&gt;Recipes may be time-consuming to prepare</td>
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<tr>
<td>Weight Watchers (commercial organization)</td>
<td>Point exchange system (calorie counting equivalent)&lt;br&gt;Earn or spend points with exercise and food&lt;br&gt;Weekly behavioral component (group support), weigh-ins, and physical activity recommendations</td>
<td>Low drop-out rate*&lt;br&gt;4.6-pound weight loss at 1 year**</td>
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<tr>
<td>Jenny Craig (commercial organization)</td>
<td>Restrict calorie intake&lt;br&gt;Prepackaged meals only&lt;br&gt;Individual behavioral counseling and exercise recommendations</td>
<td>Expensive due to meals&lt;br&gt;Minimal time for food prep&lt;br&gt;Average drop-out rate*&lt;br&gt;14-pound weight loss at 1 year***</td>
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<td>Slim-Fast (commercial products)</td>
<td>Meal replacement system—1 to 2 meals a day are replaced with 400-calorie drink or bar</td>
<td>Convenient, minimal time involvement&lt;br&gt;High drop-out rate*&lt;br&gt;Reported “as effective as calorie-control diet”</td>
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<td>Atkins (self-help book)</td>
<td>Low-carbohydrate diet&lt;br&gt;No restriction on proteins or fats</td>
<td>Requires total calorie restriction for weight loss&lt;br&gt;Average drop-out rate*&lt;br&gt;4.6-pound weight loss at 1 year**</td>
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<td>Ornish (self-help book)</td>
<td>Low-fat diet&lt;br&gt;Bans on meat, fish, oils, alcohol, sugar, white flour</td>
<td>Drastic diet change for most people&lt;br&gt;Average drop-out rate*&lt;br&gt;3.3-pound weight loss at 1 year**</td>
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<td>TOPS (nonprofit organization)</td>
<td>Group-format weekly sessions teaching skills for healthy eating and exercise&lt;br&gt;Low-calorie diet emphasis&lt;br&gt;Encourages exercise</td>
<td>Nonprofit&lt;br&gt;No recent published data on weight loss or retention</td>
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<td>Overeaters Anonymous (self-help organization)</td>
<td>12-step program&lt;br&gt;Weekly sessions emphasizing healthy eating and physical, emotional, and spiritual recovery&lt;br&gt;Assigned sponsor</td>
<td>May be beneficial for binge eaters or others with emotional issues attached to eating&lt;br&gt;No published data on weight loss or retention</td>
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*Drop-out rate: low drop out = more than 50% continue at 1 year; average drop out = approximately 50% continue at 1 year; high dropout = less than 50% continue at 1 year.

**Independent study trials confirm weight loss amounts listed.

***Recent small randomized trial evaluating Jenny Craig versus control.

The Medical Approach

- Very-low-calorie diets
  - Require a physician’s supervision

- Prescription drugs
  - Two types: those that act in brain to reduce food intake and those that act elsewhere in the body to reduce food absorption

- Surgical options (should never be a first-line approach)
  - Gastric surgeries

- Nonprescription diet drugs and dietary supplements
  - Diet teas, bulking products, starch blockers, diet candies, sugar blockers, benzocaine
Roux-en-Y Type of Gastric Bypass Procedure

- Esophagus
- Diaphragm
- New Stomach Pouch
- Staples
- Bypassed Part of Stomach
- Flow of Food
- Unused Portion of the Small Intestine
- Small Intestine
Ask yourself the following questions prior to use of Diet Supplements and Drugs:

- Is there evidence to support the claims that this product works? Look for peer-reviewed research in mainstream publications and be wary of small, unpublished studies conducted by the product’s manufacturer.

- What are the potential risks and side effects of the product? Do the proven benefits (if any) outweigh the risk and side effects?

- If you cannot find the answers to these questions, it is best to avoid the product!
The Size Acceptance Movement

- Seeks to decrease negative body image, encourage self-acceptance, and end discrimination
- Emphasizes that people of any size can become more fit and benefit from healthier food choices
- The goal is to find a balanced approach that combines personal acceptance with promotion of a healthy body composition
Tasks for Individuals

- Emphasize components of a healthier lifestyle:
  - A balanced diet emphasizing fruits, vegetables, and whole grains in appropriate portion sizes
  - 150 minutes of moderate-intensity physical activity every week
  - Reduced time spent in sedentary activities
  - Target improvement in areas such as blood pressure, cholesterol, and blood sugar level
  - Inclusion of peer support
  - Self-acceptance of body size
  - Follow up evaluation by a health professional

- Set realistic, specific, measurable, attainable, and timely goals (SMART goals)
Tasks for Individuals

- Many behavior management tools are available to help you learn new eating and activity patterns
  - Stimulus control: identify environmental cues associated with unhealthy eating habits
  - Self-supervision: keep a log of the food you eat and the physical activity you do
  - Social support and positive reinforcement: recruit others to join you in your healthier habits
  - Stress management: use healthy techniques and problem-solving strategies to handle stress
  - Cognitive restructuring: moderate any self-defeating thoughts and emotions; redefine your body image by thinking about what your body can do
Tasks for Society

- Changes in social policies are also needed to combat the obesity epidemic
  - Promote healthy foods: lowering the price of low-fat, nutritious food would increase the rates at which people would buy them
  - Support active lifestyles through community planning
  - Support consumer awareness: if consumers don’t buy the products depicted in ads, or if they complain about the content of ads, food manufacturers will eventually respond
  - Encourage health insurers to cover obesity prevention programs
In Class Assignment

- How is healthy body weight defined?
- What factors influence weight?
- What is the best way to manage weight?
- Are there quick fixes for overweight and obesity?
- How can individual and society promote healthy weight throughout life?