

# DIVERSIFIED HEALTH OCCUPATIONS

**Seventh Edition**

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**Diversified Health Occupations, Seventh Edition**

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# CHAPTER 11

# Nutrition and Diets



## Chapter Objectives

After completing this chapter, you should be able to:

- ◆ Define the term *nutrition* and list the effects of good and bad nutrition
- ◆ Name the six groups of essential nutrients and their functions and sources
- ◆ Differentiate between the processes of digestion, absorption, and metabolism
- ◆ Create a sample daily menu using the five major food groups and recommendations on *My Pyramid*
- ◆ Use the body mass index (BMI) graph to determine an individual's BMI
- ◆ Calculate an individual's daily required caloric intake to maintain current weight
- ◆ Name, describe, and explain the purposes of at least eight therapeutic diets
- ◆ Define, pronounce, and spell all key terms

Observe Standard  
Precautions



Instructor's Check—Call  
Instructor at This Point



Safety—Proceed with  
Caution



OBRA Requirement—Based  
on Federal Law



Math Skill



Legal Responsibility



Science Skill



Career Information



Communications Skill



Technology



## KEY TERMS

### absorption

**anorexia** (*an-oh-rex'-ee'-ah*)

### antioxidants

**atherosclerosis** (*ath-eh-row'-skleh-row'-sis*)

**basal metabolic rate (BMR)**  
(*base'-al met'-ah-ball'-ik*)

### bland diet

**body mass index (BMI)**

### calorie

**calorie-controlled diets**

**carbohydrates**

**cellulose**

**cholesterol** (*co'-less'-ter-all*)

**diabetic diet**

**digestion**

**essential nutrients**

**fat-restricted diets**

**fats**

**hypertension** (*high'-purrtent'-shun*)

**kilocalorie (kcal)** (*kill'-oh-kall'-oh-ree*)

**lipids**

**liquid diets**

**low-cholesterol diet**

**low-residue diet**

**malnutrition**

**metabolism** (*meh-tab'-oh-liz'-em*)

**minerals**

**nutrition**

**nutritional status**

**obesity**

**osteoporosis** (*os-tee'-oh-pour-oh'-sis*)

**overweight**

**peristalsis** (*per-eh-stall'-sis*)

**protein diets**

**proteins**

**regular diet**

**sodium-restricted diets**

**soft diet**

**therapeutic diets** (*ther'-ah-pew'-tick*)

**underweight**

**vitamins**

**wellness**

## 11:1 Information



### Fundamentals of Nutrition

People enjoy food and like to discuss it. Most people know that there is an important relationship between food and good health. However, many people do not know which nutrients are needed or why they are necessary. They are not able to select proper foods in their daily diets in order to promote optimum health. Therefore, it is important for every health care worker to have a solid understanding of basic nutrition. With this understanding, the health care worker can both practice and promote good nutrition.

**Nutrition** includes all body processes relating to food. These include digestion, absorption, metabolism, circulation, and elimination. These processes allow the body to use food for energy, maintenance of health, and growth. **Nutritional status** refers to the state or condition of one's nutrition. The goal is, of course, to be in a state of good nutrition and to maintain **wellness**, a state of good health with optimal body function. To do this, one must choose foods that are needed by the body, and not just foods that taste good.

Nutrition plays a large role in determining height, weight, strength, skeletal and muscular development, physical agility, resistance to dis-

ease, appetite, posture, complexion, mental ability, and emotional and psychological health. The immediate effects of good nutrition include a healthy appearance, a well-developed body, a good attitude, proper sleep and bowel habits, a high energy level, enthusiasm, and freedom from anxiety. In addition, the effects of good nutrition accumulate throughout life and may prevent or delay diseases or conditions such as the following:

- ◆ **Hypertension:** high blood pressure; may be caused by an excess amount of fat or salt in the diet; can lead to diseases of the heart, blood vessels, and kidneys
- ◆ **Atherosclerosis:** condition in which arteries are narrowed by the accumulation of fatty substances on their inner surfaces; thought to be caused by a diet high in saturated fats and cholesterol; can lead to heart attack or stroke
- ◆ **Osteoporosis:** condition in which bones become porous (full of tiny openings) and break easily; one cause is long-term deficiencies of calcium, magnesium, and vitamin D
- ◆ **Malnutrition:** the state of poor nutrition; may be caused by poor diet or illness. Symptoms include fatigue, depression, poor posture, being overweight or underweight, poor



**FIGURE 11-1** This child shows many of the signs of severe malnutrition. (Courtesy of the Centers for Disease Control and Prevention, Public Health Image Library)

complexion, lifeless hair, and irritability (figure 11-1). It can cause deficiency diseases, poor muscular and skeletal development, reduced mental abilities, and even death. Malnutrition is most likely to affect individuals living in extreme poverty, patients undergoing drug therapy such as treatment for cancer, infants, young children, adolescents, and the elderly. Obesity is also a form of malnutrition, caused by excess food consumption.

## 11:2 INFORMATION

### Essential Nutrients

**Essential nutrients** are composed of chemical elements found in food. They are used by the body to perform many different body functions. As the body uses the elements, they are replaced by elements in the food one eats. The essential nutrients are divided into six groups. The six groups and the specific functions of each group are shown in table 11-1.

## CARBOHYDRATES

**Carbohydrates** are the major source of readily usable human energy. They are commonly called *starches* or *sugars*. Carbohydrates are a cheaper source of energy than are proteins and fats because they are mainly produced by plants. They are easily digested, grow well in most climates, and keep well without refrigeration. They are made of carbon, hydrogen, and oxygen.

**TABLE 11-1** The Six Essential Nutrient Groups

NUTRIENT GROUPS	FUNCTIONS
<b>Carbohydrates</b>	Provide heat and energy Supply fiber for good digestion and elimination
<b>Lipids (Fats)</b>	Provide fatty acids needed for growth and development Provide heat and energy Carry fat-soluble vitamins (A, D, E, and K) to body cells
<b>Proteins</b>	Build and repair body tissue Provide heat and energy Help produce antibodies
<b>Vitamins</b>	Regulate body functions Build and repair body tissue
<b>Minerals</b>	Regulate body functions Build and repair body tissue
<b>Water</b>	Carries nutrients and wastes to and from body cells Regulates body functions

The main sources of carbohydrates are breads, cereals, noodles or pastas, crackers, potatoes, corn, peas, beans, grains, fruits, sugar, and syrups.

**Cellulose** is the fibrous, indigestible form of plant carbohydrate. It is important because it provides bulk in the digestive tract and causes regular bowel movements. The best sources of cellulose are bran, whole-grain cereals, and fibrous fruits and vegetables.

## LIPIDS (FATS)

**Lipids**, commonly called **fats** and oils, are organic compounds. Three of the most common lipids found in both food and the human body are *triglycerides* (fats and fatty acids), *phospholipids* (lecithin), and *sterols* (cholesterol). Lipids are also made of carbon, hydrogen, and oxygen, but they contain more oxygen than carbohydrates. Fats provide the most concentrated form of energy but are a more expensive source of energy than carbohydrates. Fats also maintain body temperature by providing insulation, cushion organs and bones, aid in the absorption of

fat-soluble vitamins, and provide flavor to meals. The main sources of fats include butter, margarine, oils, cream, fatty meats, cheeses, and egg yolk.

Fats are also classified as saturated or polyunsaturated. *Saturated fats* are usually solid at room temperature. Examples include the fats in meats, eggs, whole milk, cream, butter, and cheeses. *Polyunsaturated fats* are usually soft or oily at room temperature. Examples include vegetable oils, margarines and other products made from vegetable oils, fish, and peanuts.

**Cholesterol** is a sterol lipid found in body cells and animal products. It is used in the production of steroid hormones, vitamin D, and bile acids. Cholesterol is also a component of cell membranes. Common sources are egg yolk, fatty meats, shellfish, butter, cream, cheeses, whole milk, and organ meats (liver, kidney, and brains). In addition, cholesterol is synthesized (manufactured) by the liver. Cholesterol is transported in the bloodstream mainly by two carrier molecules called *lipoproteins*. They are known as HDL and LDL, or high-density and low-density lipoprotein. HDL, commonly called “good” cholesterol, tends to transport cholesterol back to the liver and prevents plaque from accumulating on the walls of arteries. LDL, commonly called “bad” cholesterol, tends to contribute to plaque buildup and an excess amount leads to atherosclerosis. Consequently, it is advisable to limit the intake of foods that contain fats from animal sources.

## PROTEINS

**Proteins** are the basic components of all body cells. They are essential for building and repairing tissue, regulating body functions, and providing energy and heat. They are made of carbon, hydrogen, oxygen, and nitrogen, and some also contain sulfur, phosphorus, iron, and iodine.

Proteins are made up of 22 “building blocks” called *amino acids*. Nine of these amino acids are essential to life. The proteins that contain these nine are called *complete proteins*. The best sources of complete proteins are animal foods such as meats, fish, milk, cheeses, and eggs. Proteins that contain any of the remaining 13 amino acids and some of the 9 essential amino acids are called *incomplete proteins*. Sources of incomplete proteins are usually vegetable foods such as cereals, soybeans, dry beans, peas, corn, and nuts. Choos-

ing plant foods carefully can provide a mixture of amino acids from incomplete proteins that contain all the essential amino acids. It is important for a vegetarian to select foods that meet these dietary needs.

## VITAMINS

**Vitamins** are organic compounds that are essential to life. They are important for metabolism, tissue building, and regulation of body processes. They allow the body to use the energy provided by carbohydrates, fats, and proteins. Only small amounts of vitamins are required, and a well-balanced diet usually provides the required vitamins. An excess amount of vitamins or a deficiency of vitamins can cause poor health.

Some vitamins are **antioxidants**, organic molecules that help protect the body from harmful chemicals called *free radicals*. In the body, oxygen used during metabolism causes free radicals to form. Free radicals can damage tissues, cells, and even genes in the same way that oxygen causes metals to rust or apples to become brown. Research is indicating that free radicals can lead to the development of chronic diseases such as cancer, heart disease, and arthritis. Antioxidants, found mainly in fruits and vegetables, deactivate the free radicals and prevent them from damaging body cells. The main antioxidant vitamins are vitamins A, C, and E.

Vitamins are usually classified as water soluble or fat soluble. *Water-soluble* vitamins dissolve in water, are not normally stored in the body, and are easily destroyed by cooking, air, and light. *Fat-soluble* vitamins dissolve in fat, can be stored in the body, and are not easily destroyed by cooking, air, and light. Some of the vitamins along with their sources and functions are listed in table 11-2.

## MINERALS

**Minerals** are inorganic (nonliving) elements found in all body tissues. They regulate body fluids, assist in various body functions, contribute to growth, and aid in building tissues. Some minerals, such as selenium, zinc, copper, and manganese, are antioxidants. Table 11-3 lists some of the minerals essential to life, their sources, and their main functions.

**TABLE 11-2** Vitamins

Vitamins	Best Sources	Functions
<b>Fat-Soluble Vitamins</b>		
Vitamin A (Retinol)	Liver, fatty fish Butter, margarine Whole milk, cream, cheese Egg yolk Leafy green and yellow vegetables	Growth and development Health of eyes Structure and functioning of the cells of the skin and mucous membranes Antioxidant to protect cells from free radicals
Vitamin D (Calciferol)	Sunshine (stimulates production in skin) Fatty fish, liver Egg yolk Butter, cream, fortified milk	Growth Regulates calcium and phosphorous absorption and metabolism Builds and maintains bones and teeth
Vitamin E (Tocopherol)	Vegetable oils, butter, margarine Peanuts Egg yolk Dark green leafy vegetables Soybeans and wheat germ	Necessary for protection of cell structure, especially red blood cells and epithelial cells Antioxidant to inhibit breakdown of vitamin A and some unsaturated fatty acids
Vitamin K	Spinach, kale, cabbage, broccoli Liver Soybean oil Cereals	Normal clotting of blood Formation of prothrombin
<b>Water-Soluble Vitamins</b>		
Thiamine (B <sub>1</sub> )	Enriched bread and cereals Liver, heart, kidney, lean pork Potatoes, legumes	Carbohydrate metabolism Promotes normal appetite and digestion Normal function of nervous system
Riboflavin (B <sub>2</sub> )	Milk, cheese, yogurt, eggs Enriched breads and cereals Dark green leafy vegetables Liver, kidney, heart, fish	Carbohydrate, fat, and protein metabolism Health of mouth tissue Healthy eyes
Niacin (Nicotinic Acid)	Meats (especially organ meats) Poultry and fish Enriched breads and cereals Peanuts and legumes	Carbohydrate, fat, and protein metabolism Healthy skin, nerves, and digestive tract
Pyridoxine (B <sub>6</sub> )	Liver, kidney, pork Poultry and fish Enriched breads and cereals	Protein synthesis and metabolism Production of antibodies
Vitamin B <sub>12</sub> (Cobalamin)	Liver, kidney, muscle meats, seafood Milk, cheese Eggs	Metabolism of proteins Production of healthy red blood cells Maintains nerve tissue
Vitamin C (Ascorbic Acid)	Citrus fruits, pineapple Melons, berries, tomatoes Cabbage, broccoli, green peppers	Healthy gums Aids in wound healing Aids in absorption of iron Formation of collagen
Folic Acid (Folacin)	Green leafy vegetables Citrus fruits Organ meats, liver Whole-grain cereals, yeast	Protein metabolism Maturation of red blood cells Formation of hemoglobin Synthesis of DNA Reduces risk for neural tube defect (spina bifida) in fetus—important for pregnant women to consume recommended daily amount

**TABLE 11-3** Minerals

Minerals	Best Sources	Functions
Calcium (Ca)	Milk and milk products Cheese Salmon and sardines Some dark green leafy vegetables	Develops/maintains bones and teeth Clotting of the blood Normal heart and muscle action Nerve function
Phosphorus (P)	Milk and cheese Meat, poultry, fish Nuts, legumes Whole-grain cereals	Develops/maintains bones and teeth Maintains blood acid–base balance Metabolism of carbohydrates, fats, and proteins Constituent of body cells
Magnesium (Mg)	Meat, seafood Nuts and legumes Milk and milk products Cereal grains Fresh green vegetables	Constituent of bones, muscles, and red blood cells Healthy muscles and nerves Metabolism of carbohydrates and fats
Sodium (Na)	Salt Meat and fish Poultry and eggs Milk, cheese	Fluid balance, acid–base balance Regulates muscles and nerves Glucose (sugar) absorption
Potassium (K)	Meat Milk and milk products Vegetables Oranges, bananas, prunes, raisins Cereals	Fluid balance Regular heart rhythm Cell metabolism Proper nerve function Regulates contraction of muscles
Chlorine (Cl) (Chloride)	Salt Meat, fish, poultry Milk, eggs	Fluid balance Acid–base balance Formation of hydrochloric acid
Sulfur (S)	Meat, poultry, fish Eggs	Healthy skin, hair, and nails Activates energy-producing enzymes
Iron (Fe)	Liver, muscle meats Dried fruits Egg yolk Enriched breads and cereals Dark green leafy vegetables	Formation of hemoglobin in red blood cells Part of cell enzymes Aids in production of energy
Iodine (I)	Saltwater fish Iodized salt	Formation of hormones in thyroid gland Regulates basal metabolic rate
Copper (Cu)	Liver, organ meats, seafood Nuts, legumes Whole-grain cereals	Utilization of iron Component of enzymes Formation of hemoglobin in red blood cells
Fluorine (F) (Fluoride)	Fluoridated water Fish, meat, seafood	Healthy teeth and bones
Zinc (Zn)	Seafood, especially oysters Eggs Milk and milk products	Component of enzymes and insulin Essential for growth and wound healing
Selenium (Se)	Organ meats Seafood	Metabolism of fat Acts as antioxidant



## WATER

Water is found in all body tissues. It is essential for the digestion (breakdown) of food, makes up most of the blood plasma and cytoplasm of cells, helps body tissues absorb nutrients, and helps move waste material through the body. Although water is found in almost all foods, the average person should still drink six to eight glasses of water each day to provide the body with the water it needs.

## 11:3 INFORMATION

### Utilization of Nutrients

Before the body is able to use nutrients, it must break down the foods that are eaten to obtain the nutrients and then absorb them into the circulatory system. These processes are called *digestion* and *absorption* (figure 11-2). The actual use of the nutrients by the body is called *metabolism*. These processes are discussed in greater detail in Chapter 7:11 of this textbook.

## DIGESTION

**Digestion** is the process by which the body breaks down food into smaller parts, changes the

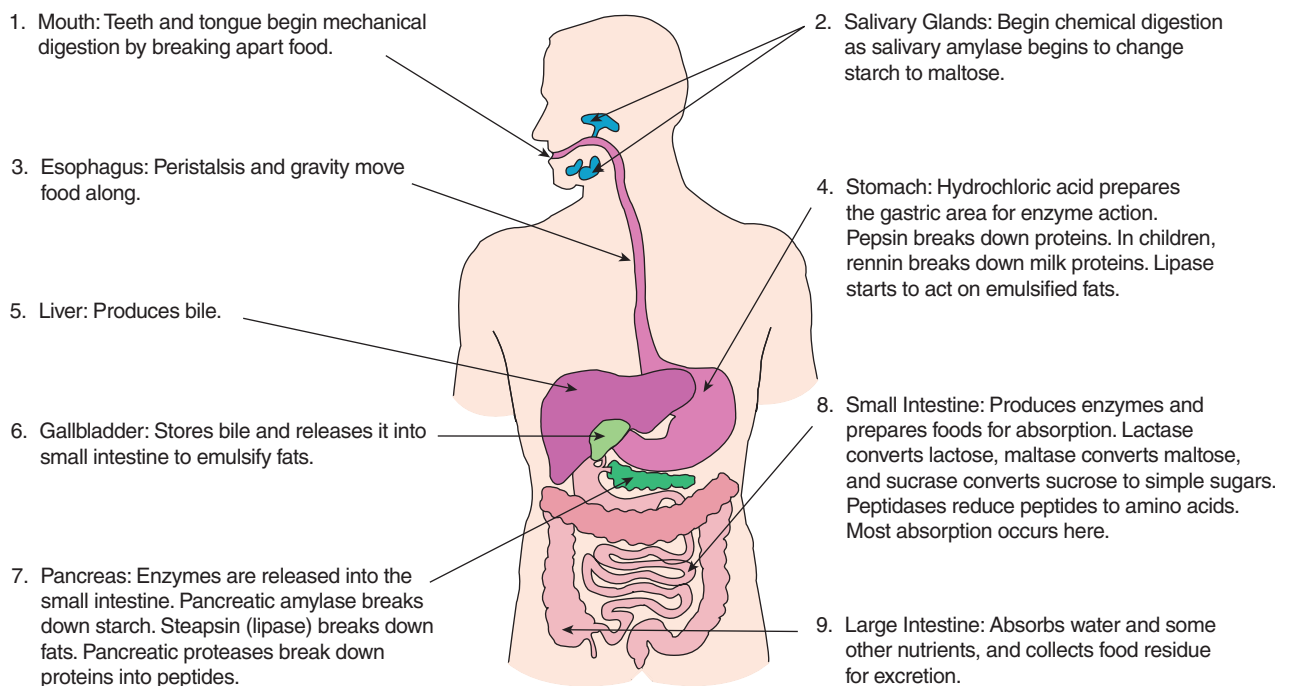
food chemically, and moves the food through the digestive system. There are two types of digestive action: mechanical and chemical. During mechanical digestion, food is broken down by the teeth and moved through the digestive tract by a process called **peristalsis**, a rhythmic, wavelike motion of the muscles. During chemical digestion, food is mixed with digestive juices secreted by the mouth, stomach, small intestine, and pancreas. The digestive juices contain enzymes, which break down the food chemically so the nutrients can be absorbed into the blood.

## ABSORPTION

After the food is digested, absorption occurs. **Absorption** is the process in which blood or lymph capillaries pick up the digested nutrients. The nutrients are then carried by the circulatory system to every cell in the body. Most absorption occurs in the small intestine, but water, salts, and some vitamins are absorbed in the large intestine.

## METABOLISM

After nutrients have been absorbed and carried to the body cells, **metabolism** occurs. This is the process in which nutrients are used by the cells



**FIGURE 11-2** The processes of digestion and absorption.

for building tissue, providing energy, and regulating various body functions. During this process, nutrients are combined with oxygen, and energy and heat are released. Energy is required for voluntary work, such as swimming or housecleaning, and for involuntary work, such as breathing and digestion. The rate at which the body uses energy just for maintaining its own tissue, without doing any voluntary work, is called the **basal metabolic rate**, or **BMR**. The body needs energy continuously, so it stores some nutrients for future use. These stored nutrients are used to provide energy when food intake is not adequate for energy needs.

## 11:4 INFORMATION



### Maintenance of Good Nutrition

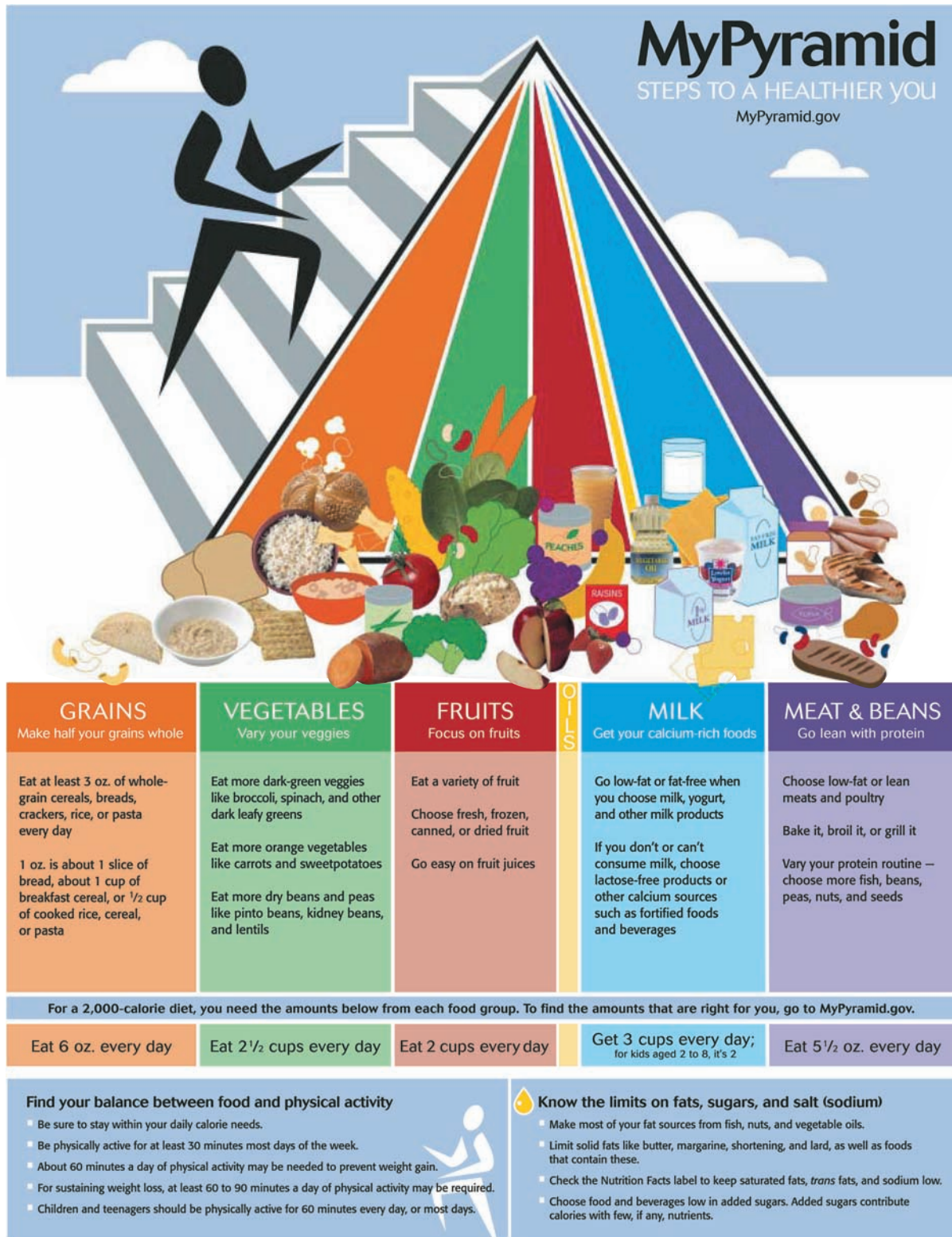
Good health is everyone's goal, and good nutrition is the best way of achieving and maintaining it. Normally, this is accomplished by eating a balanced diet in which all of the required nutrients are included in correct amounts. The simplest guide for planning healthy meals is the *U.S. Department of Agriculture (USDA) Food Guide*, which classifies foods into five major food groups. Foods are arranged in groups containing similar nutrients. This is known as *My Pyramid* (figure 11-3). The pyramid has rainbow-hued bands running vertically. Each color represents a different food group. The width of the bands represents the relative proportionate amount of each group that an individual should consume every day. The importance of exercise is emphasized by the person climbing the side of the pyramid. *My Pyramid* stresses that one size does not fit everyone. Individuals are encouraged to utilize the *My Pyramid* Web site ([www.mypyramid.gov](http://www.mypyramid.gov)) to develop a customized food plan based on age, sex, and physical activity. This helps an individual to make smart choices from every food group, determine the required balance between food and physical activity, and gain optimal nutrition from calories consumed.

An example of a food plan for an individual requiring 2,000 calories per day is shown in table 11-4. It lists the five major food groups, recommended daily amount, average serving size, and nutrient contents of the foods. A sample menu using these recommendations is shown in table 11-5.

Although the major food groups are a key to healthy meal plans, variety, taste, color, aroma, texture, and general food likes and dislikes must also be considered. If food is not appealing, people will usually not eat it even though it is healthy.

Sound and sensible nutritional principles can be found in the booklet published by the U.S. Department of Agriculture (USDA) and entitled *Finding Your Way to a Healthier You: Dietary Guidelines for Americans*. Some guidelines discussed in greater detail in the booklet include:

- ◆ *Make smart choices from every food group.* Eat a variety of foods. Choose different foods from each of the five major food groups each day. Adjust the number and size of portions based on body weight and nutritional needs. This helps provide the wide variety of nutrients required for good health.
- ◆ *Find your balance between food and physical activity.* Be physically active for at least 30 minutes most days of the week. Children, teenagers, and adults trying to lose weight should be physically active for 60 minutes each day. Maintain healthy weight. Determine your proper body weight and try to maintain this weight by proper eating habits and exercise.
- ◆ *Limit fats.* Choose a diet low in fat, saturated fat, and cholesterol. Eat lean meat, poultry without skin, fish, and low-fat dairy products. Use fats and oils sparingly and limit fried foods.
- ◆ *Get the most nutrition out of your calories.* Determine the correct number of calories you should eat daily. Then choose nutritionally rich foods that are high in nutrients but lower in calories. Choose a diet with plenty of vegetables, fruits, and grain products.
- ◆ *Don't sugarcoat it.* Use sugars only in moderation. Limit cookies, candy, cakes, and soft drinks. Brush and floss your teeth after eating sweet foods.
- ◆ *Reduce sodium (salt) and increase potassium.* Use salt and sodium only in moderation. Flavor foods with herbs and spices. Reduce the amount of salty foods. Eat foods high in potassium to counteract some of the effect of sodium on blood pressure.



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**FIGURE 11-3** My Pyramid provides the guidelines for a healthier you. (Courtesy of the U.S. Department of Agriculture, www.mypyramid.gov)

**TABLE 11-4** *My Pyramid* for a 2,000 Calorie Diet

FOOD GROUP	RECOMMENDED DAILY AMOUNT	AVERAGE RECOMMENDED PORTION SIZE	NUTRIENT CONTENT
<b>Grains (Breads, Cereals, Rice, &amp; Pasta)</b>	6 ounces	1 slice bread 1/2 bagel or English muffin 1/2 cup cooked cereal 1/2 cup cooked pasta or rice 1 cup dry cereal	Carbohydrates; phosphorus; magnesium; potassium; iron; vitamins B, K, and folic acid
<b>Vegetables</b>	2 1/2 cups	1 cup raw leafy vegetables 1/2 cup cooked vegetables 3/4 cup vegetable juice	Carbohydrates; iron; calcium; potassium; magnesium; vitamins A, B, C, E, K, and folic acid
<b>Fruits</b>	2 cups	1 medium size fruit 1/2 cup canned/cooked fruit 1/4 cup dried fruit 1 cup fruit juice 1 cup fresh fruit	Carbohydrates; potassium; vitamin C and folic acid
<b>Milk, Milk Products, Yogurt, &amp; Cheese</b>	3 cups	1 cup milk, yogurt, pudding 1 1/2 ounces cheese 1 cup cottage cheese 1 cup ice cream	Protein; carbohydrate; fat; calcium; potassium; sodium; magnesium; phosphorus; vitamins A, B <sub>12</sub> , D, and riboflavin
<b>Meats, Fish, Poultry, Dry Beans, Eggs, &amp; Nuts</b>	5 1/2 ounces	1 ounce meat, fish, or poultry 1/4 cup dry beans 1/2 cup cooked beans 1 egg 1 tablespoon peanut butter 1/2 ounce nuts	Proteins; fats; iron; sulfur; copper; iodine; sodium; magnesium; zinc; potassium; phosphorus; chlorine; fluorine; vitamins A, B, and D

**TABLE 11-5** Sample Menu Using *My Pyramid* Guidelines

BREAKFAST	LUNCH	DINNER
1 cup orange juice	Tuna fish sandwich:	3 ounces roasted chicken
1 cup dry cereal	2 slices wheat bread	1/2 cup rice
1 slice whole-grain toast	3 ounces tuna	1/2 cup broccoli
1 teaspoon margarine	2 slices tomato	1 cup green salad
1 cup fat-free milk	1 lettuce leaf	1 tablespoon vinegar/oil dressing
1 small banana	8 small raw carrots	1 small dinner roll
	1 oatmeal cookie	1/2 teaspoon margarine
	1 unsweetened beverage	1 cup fat-free milk
		1 cup low-fat fruit yogurt

Suggested snacks: 1/4 cup dried fruit, 1/2 ounce nuts, 2 tablespoons raisins, 1 cup popcorn, 1 medium fruit

◆ *Read food labels to know the facts about the foods you eat.* Most foods have a Nutrition Facts label (figure 11-4). Check the label to determine the serving size and number of servings in the container. Evaluate the number of calories per serving to determine whether the food is a low- or high-calorie food. Calculate the amount of

fat and try to keep total fat intake between 20 and 35 percent of total caloric intake. Look at the daily value percentage for each nutrient listed to determine whether the food is nutritious and worth eating. Avoid empty calories or high-calorie foods with no vitamins, minerals, carbohydrates, and/or proteins.

# Nutrition Facts

Serving Size 1/2 cup (114g)

Servings Per Container 4

## Amount Per Serving

**Calories** 90      Calories from Fat 30

**% Daily Value**

**Total Fat** 3g      **5%**

Saturated Fat 0g      **0%**

**Cholesterol** 0mg      **0%**

**Sodium** 300mg      **13%**

**Total Carbohydrate** 13g      **4%**

Dietary Fiber 3g      **12%**

Sugars 3g

**Protein** 3g

Vitamin A 80% • Vitamin C 60%

Calcium 4% • Iron 4%

• Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

		Calories	2,000	2,500
Total Fat	Less than	65g	80g	
Sat Fat	Less than	20g	25g	
Cholesterol	Less than	300mg	300mg	
Sodium	Less than	2,400mg	2,400mg	
Total Carbohydrate		300g	375g	
Fiber		25g	30g	

Calories per gram:

Fat 9 • Carbohydrate 4 • Protein 4

**FIGURE 11-4** It is important to check food labels to determine the caloric and nutrient content of the food. (Courtesy of the Food and Drug Administration)

- ◆ *Be aware that alcohol can be harmful to your health.* If alcohol is consumed, it should be in moderation. Alcohol should be avoided by pregnant women, individuals using medications, children and adolescents, and individuals who are driving or engaging in an activity that requires attention or skill.

Following the preceding guidelines will result in a diet that will maintain and may even improve health.

Food habits also affect nutrition. At times, habits are based on cultural or religious beliefs.

Different cultures and races have certain food preferences. Some religions require certain dietary restrictions that must be observed (see table 11-6). Unusual habits are not necessarily bad. They should be evaluated using the five major food groups as a guide. When habits do require changing in order to improve nutrition, the person making suggestions must use tact, patience, and imagination. Many food habits are formed during youth, and changing them is a difficult and slow process.

## 11:5 INFORMATION

### Weight Management

⊕ Good nutrition and adequate exercise allow an individual to maintain a *normal* weight, or body weight that is in proportion to body height. Many charts are available to provide suggested ranges of weight based on an individual's height. In addition, a general formula can be used to calculate an approximate desired weight for adults. Basic principles include:

- ◆ *Male individuals:* For the first 60 inches (5 feet) of height, a male individual should weigh 106 pounds. For each inch over 60 inches, 6 pounds should be added. For example, a man measuring 74 inches (6 feet 2 inches) should weigh approximately 190 pounds: 106 pounds plus 84 pounds (6 pounds  $\times$  14 inches = 84) equals 190 pounds.
- ◆ *Female individuals:* For the first 60 inches of height, a female individual should weigh 100 pounds. For each inch over 60 inches, 5 pounds should be added. For example, a woman measuring 68 inches (5 feet 8 inches) should weigh approximately 140 pounds: 100 pounds plus 40 pounds (5 pounds  $\times$  8 inches) equals 140 pounds.
- ◆ *Large-boned individuals:* Increase the weight by 10 percent for individuals of either sex who have a large bone structure.
- ◆ *Small-boned individuals:* Decrease the weight by 10 percent for individuals of either sex who have a small bone structure.

Even though the above formulas provide a basic desired weight, most research has shown that a better indication of an individual's health status is body mass index. **Body mass index**

**TABLE 11-6** Religious Dietary Restrictions

RELIGION	COFFEE & TEA	ALCOHOL	DAIRY PRODUCTS	PORK & PORK PRODUCTS	MEAT	SPECIAL RESTRICTIONS
<b>Baptist (Strict)</b>	Restricted	Prohibited				Some groups drink coffee and tea Many are ovolactovegetarians (use eggs and milk, but no meat)
<b>Buddhist</b>	Some sects prohibit	Some sects prohibit		Some sects abstain	Some sects abstain	Many sects are vegetarians Some sects eat beef and pork Some may refuse strong spices
<b>Christian Scientist</b>	Most avoid	Most avoid				
<b>Greek Orthodox (Eastern Orthodox)</b>			Wednesdays and Fridays during Lent and other Holy Days		Wednesdays and Fridays during Lent and other Holy Days	Avoid food and beverages before communion
<b>Hindu</b>		Most avoid		Prohibited	Beef prohibited because cow is sacred	Most are vegetarians Many do not use eggs as they represent life
<b>Islamic, Muslim</b>		Prohibited		Prohibited		Do not eat or drink during daylight hours in month of Ramadan Shellfish forbidden Meat must be slaughtered according to specific rules
<b>Jewish (Orthodox)</b>			Must not be prepared or eaten with meat	Prohibited	Must not be prepared or eaten with dairy products	Forbids cooking on Sabbath Shellfish forbidden Food must be prepared according to Kosher rules May fast on certain holy days
<b>Mormon (Latter Day Saints)</b>	Prohibited	Prohibited			Encouraged to eat sparingly	Cola and other caffeine drinks prohibited Some fast on the first Sunday of each month
<b>Roman Catholic</b>					Refrain from meat on Ash Wednesday and Fridays during Lent	Many avoid food and beverages 1 hour prior to communion
<b>Seventh Day Adventist</b>	Prohibited	Prohibited		Prohibited		Vegetarian diet is encouraged Avoid shellfish Prohibit foods containing caffeine

**(BMI)** is a calculation that measures weight in relation to height and correlates this with body fat. It is determined by dividing a person's weight in kilograms by height in meters squared. A graphic chart showing BMI ranges is the easiest way to determine BMI (figure 11-5). The ideal range is 18.5–24.9. A BMI less than 18.5 indicates the individual is underweight. A BMI greater than 25 is indicative of excess weight and more health risks.

## UNDERWEIGHT AND OVERWEIGHT

Weight management is used to achieve and maintain the desired body weight. The major conditions that occur due to poor nutrition and improper exercise are underweight, overweight, and obesity.

**Underweight** is a body weight that is 10 to 15 percent less than the desired weight. Underweight individuals are much more likely to have nutritional deficiencies. Causes can include inadequate intake of food, excessive exercise, severe infections, eating disorders, diseases that cause anorexia (lack of appetite), and/or starvation. Treatment involves gradually increasing the amount of food consumed, eating higher calorie foods, counseling and medical treatment for eating disorders or diseases, and decreasing exercise if excessive exercise is a cause.

**Overweight** is a body weight that is 10–20 percent greater than the average recommended weight for a person's height. **Obesity** is excessive body weight 20 percent or more above the average recommended weight. Obesity has become a major health concern in the United States. Research by the National Center for Health Statistics shows that more than 30 percent of adults are obese. This means that more than 60 million adults in the United States are obese. Statistics also show that more than 15 percent of young people aged 6 to 17 are overweight. The main causes of obesity are excessive calorie consumption and inadequate physical activity. Genetic, psychological, biochemical (metabolic), socioeconomic, cultural, and environmental factors can contribute to these conditions. Treatment involves modifying eating habits and increasing physical activity. In more severe cases, medical intervention with medications, counseling, and even surgery may be necessary. If obesity is not

controlled, an individual is at high risk for development of hypertension, diabetes mellitus, coronary heart disease, high cholesterol, cerebrovascular accident (stroke), osteoarthritis, gallbladder disease, breathing problems such as sleep apnea, and many other similar conditions. Research has also shown that obesity decreases life span and causes many early deaths.

Following the principles shown on *My Pyramid* and in the USDA dietary guidelines is the easiest way to manage weight. Every person should become familiar with these principles and make every attempt to follow them on a daily basis. Even though poor food habits are hard to break, it can be done if an individual is motivated to change his or her behavior.

## MEASURING FOOD ENERGY

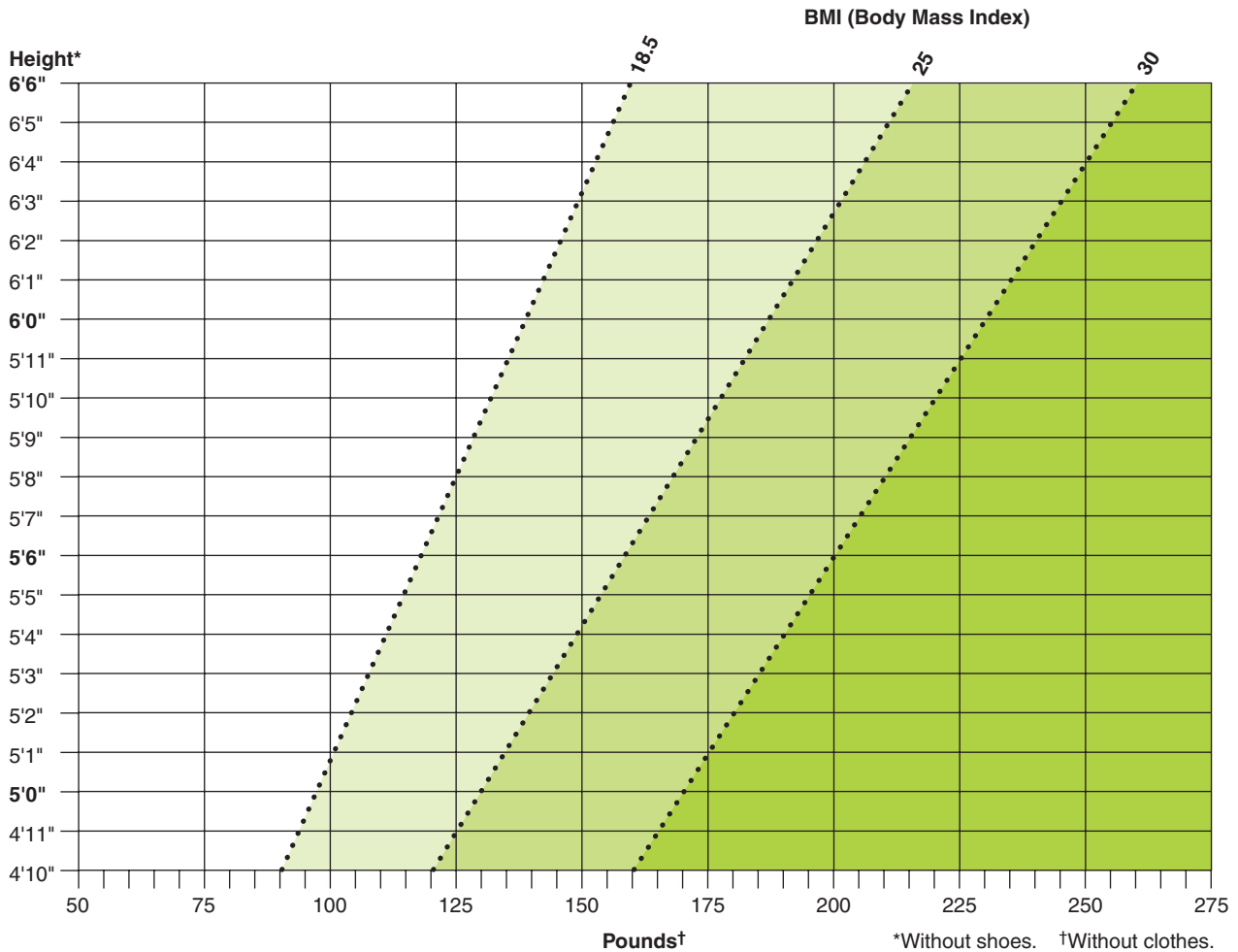
Foods vary in the amount of energy they contain. For example, a candy bar provides more energy than does an apple. When the body metabolizes nutrients to produce energy, heat is also released. The amount of heat produced during metabolism is the way the energy content of food is measured. This heat is measured by a unit called a **kilocalorie (kcal)**, or just **calorie**. The number of kilocalories, or calories, in a certain food is known as that food's *caloric value*. Carbohydrates and proteins provide four calories per gram. Fat provides nine calories per gram. Vitamins, minerals, and water do not provide any calories.

An individual's caloric requirement is the number of kilocalories, or calories, needed by the body during a 24-hour period. Caloric requirements vary from person to person, depending on activity, age, size, sex, physical condition, and climate. The amount of physical activity or exercise is usually the main factor determining caloric requirement, because energy used must be replaced. An individual who wants to gain weight can decrease activity and increase caloric intake. An individual who wants to lose weight can increase activity and decrease caloric intake.

## MANAGING WEIGHT

Most people know that maintaining desired body weight can lead to a longer and healthier life. For this reason, many individuals try many different

## ARE YOU A HEALTHY WEIGHT?



BMI measures weight in relation to height. The BMI ranges shown above are for adults. They are not exact ranges of healthy and unhealthy weights. However, they show that health risk increases at higher levels of overweight and obesity. Even within the healthy BMI range, weight gains can carry health risks for adults.

**Directions:** Find your weight on the bottom of the graph. Go straight up from that point until you come to the line that matches your height. Then look to find your weight group.

- Healthy Weight** BMI from 18.5 up to 25 refers to healthy weight.
- Overweight** BMI from 25 up to 30 refers to overweight.
- Obese** BMI 30 or higher refers to obesity. Obese persons are also overweight.

Source: *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2000.*


**FIGURE 11-5** Body mass index (BMI) helps individuals determine healthy weight ranges. (From *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2000*)



types of diets to lose weight. Research has shown that even though these diets might lead to weight loss, they usually do not allow an individual to maintain weight when the diet is no longer used. Most fad diets require eating specific foods, limiting certain food groups, eating large amounts of one type of food, or using liquid supplements in place of food. When individuals resume their normal eating habits, the weight that was lost is quickly regained.

The best method for weight control is to make desired changes slowly. Research has shown that gradual weight loss with a change in habits is much healthier and more likely to be sustained. For example, a person never exercises but knows that it is important. Initially, the person may walk at a slow pace for 15 minutes every day. Gradually, the time and rate can be increased until the person is walking at a brisk pace for 30 minutes 5 days a week. At the same time that exercise increases, the number of calories consumed must change.

Before starting any weight management plan, a physician should be consulted. The physician may perform a physical examination, order blood or other laboratory tests to check for diseases that could affect weight, run an electrocardiogram, and/or order a stress test to determine cardiovascular fitness. The physician can then recommend a nutrition plan and exercise program that is customized to the individual's needs.

 A general guideline for weight loss or gain is that 1 pound of body fat equals approximately 3,500 calories. To lose 1 pound, a decrease of 3,500 calories is required, either by consuming 3,500 fewer calories or by using 3,500 calories through increased exercise. To gain 1 pound, an increase of 3,500 calories is required. A general guideline to maintain weight is that a person consume 15 calories per pound per day. For example, if a person weighs 120 pounds, maintaining this weight would require a daily intake of  $15 \times 120$ , or 1,800, calories daily. By decreasing caloric intake by 500 calories per day, a person would lose 1 pound per week (500 calories per day times 7 days equals 3,500 calories, or 1 pound of fat). By increasing caloric intake by 500 calories per day, a person would gain 1 pound per week. It is important to note that increasing or decreasing exercise along with controlling calorie intake is essential. Also, a slow, steady gain or loss of 1–2 pounds per week is an efficient and safe form of weight control.

The USDA *Dietary Guidelines* recommendations for managing weight include:

- ◆ Balance calories from foods and beverages with calories expended
- ◆ Prevent gradual weight gain by making small decreases in daily calories and small increases in physical activity
- ◆ Engage in at least 30 minutes or more of moderate-intensity physical activity most days of the week
- ◆ Consume less than 10 percent of calories from saturated fatty acids and less than 300 milligrams of cholesterol daily
- ◆ Keep daily total fat intake to between 20 and 35 percent of calories consumed
- ◆ Select lean, low-fat, or fat-free foods whenever possible
- ◆ Eat more fiber-rich fruits, vegetables, and whole grains
- ◆ Limit foods high in sugar and salt

Following these recommendations can help an individual obtain and maintain a healthy weight. This will help reduce the risk factor for heart disease, hypertension, diabetes mellitus, high cholesterol, osteoarthritis, and many other diseases. It will also allow the individual to enjoy a longer and healthier life span.

## 11:6 Information

### Therapeutic Diets

**Therapeutic diets** are modifications of the normal diet and are used to improve specific health conditions. They are normally prescribed by a doctor and planned by a dietitian. These diets may change the nutrients, caloric content, and/or texture of the normal diet. They may seem strange and even unpleasant to patients. In addition, a patient's appetite may be affected by **anorexia** (loss of appetite), weakness, illness, loneliness, self-pity, and other factors. Therefore, it is essential that the health care worker use patience and tact to convince the patient to eat the foods on the diet. An understanding of the purposes of the various diets will also help the health care worker provide simple explanations to patients.

## REGULAR DIET

A **regular diet** is a balanced diet usually used for the patient with no dietary restrictions. At times, it has a slightly reduced calorie content. Foods such as rich desserts, cream sauces, salad dressings, and fried foods may be decreased or omitted.

## LIQUID DIETS

**Liquid diets** include both clear liquids and full liquids. Both are nutritionally inadequate and should be used only for short periods of time. All foods served must be liquid at body temperature. Foods included on the clear-liquid diet are mainly carbohydrates and water, including apple or grape juice, fat-free broths, plain gelatin, fruit ice, ginger ale, and tea or black coffee with sugar (figure 11-6). The full-liquid diet includes the liquids allowed on the clear-liquid diet plus strained soups and cereals, fruit and vegetable juices, yogurt, hot cocoa, custard, ice cream, pudding, sherbet, and eggnog. These diets may be used after surgery, for patients with acute infections or digestive problems, to replace fluids lost by vomiting or diarrhea, and before some X-rays of the digestive tract.



**FIGURE 11-6** Foods included on the clear-liquid diet are mainly carbohydrates and water.

## SOFT DIET

A **soft diet** is similar to the regular diet, but foods must require little chewing and be easy to digest (figure 11-7). Foods to avoid include meat and shellfish with tough connective tissue, coarse cereals, spicy foods, rich desserts, fried foods, raw fruits and vegetables, nuts, and coconut. This diet may be used following surgery or for patients with infections, digestive disorders, or chewing problems.

## DIABETIC DIET

A **diabetic diet** is used for patients with diabetes mellitus. In this condition, the body does not produce enough of the hormone insulin to metabolize carbohydrates. Patients frequently take insulin by injection. The diet contains exchange lists that group foods according to type, nutrients, and caloric content. Patients are allowed a certain number of items from each exchange list according to their individual needs. Sugar-heavy foods such as candy, soft drinks, desserts, cookies, syrup, honey, condensed milk, chewing gum, and jams and jellies are usually avoided.



**FIGURE 11-7** Soft diets include foods that require little chewing and are easy to digest.

## CALORIE-CONTROLLED DIETS

**Calorie-controlled diets** include both low-calorie and high-calorie diets. Low-calorie diets are frequently used for patients who are overweight. High-calorie foods are either avoided or very limited. Examples of such foods include butter, cream, whole milk, cream soups or gravies, sweet soft drinks, alcoholic beverages, salad dressings, fatty meats, candy, and rich desserts. High-calorie diets are used for patients who are underweight or have anorexia nervosa, hyperthyroidism (overactivity of thyroid gland), or cancer. Extra proteins and carbohydrates are included. High-bulk foods such as green salads, watermelon, and fibrous fruits are avoided because they fill up the patient too soon. High-fat foods such as fried foods, rich pastries, and cheese cake are avoided because they digest slowly and spoil the appetite.

## LOW-CHOLESTEROL DIET

A **low-cholesterol diet** restricts foods that contain cholesterol. It is used for patients with atherosclerosis and heart disease. Foods high in saturated fat, such as beef, liver, pork, lamb, egg yolk, cream cheese, natural cheeses, shellfish (crab, shrimp, lobster), and whole milk, are limited, as are coconut and palm oil products.

## FAT-RESTRICTED DIETS

**Fat-restricted diets** are also called *low-fat diets*. Examples of foods to avoid include cream, whole milk, cheeses, fats, fatty meats, rich desserts, chocolate, nuts, coconut, fried foods, and salad dressings. Fat-restricted diets may be used for obese patients or patients with gallbladder and liver disease or atherosclerosis.

## SODIUM-RESTRICTED DIETS

**Sodium-restricted diets** are also called *low-sodium* or *low-salt diets*. Frequently, patients use low-sodium-diet lists similar to the carbohydrate-exchange lists used by diabetic patients.

Patients should avoid or limit adding salt to food, smoked meats or fish, processed foods, pickles, olives, sauerkraut, and some processed cheeses. This diet reduces salt intake for patients with cardiovascular diseases (such as hypertension or congestive heart failure), kidney disease, and edema (retention of fluids).

## PROTEIN DIETS

**Protein diets** include both low-protein and high-protein diets. Protein-rich foods include meats, fish, milk, cheeses, and eggs. These foods would be limited or decreased in low-protein diets and increased in high-protein diets. Low-protein diets are ordered for patients with certain kidney or renal diseases and certain allergic conditions. High-protein diets may be ordered for children and adolescents, if growth is delayed; for pregnant or lactating (milk-producing) women; before and/or after surgery; and for patients suffering from burns, fevers, or infections.

## BLAND DIET

A **bland diet** consists of easily digested foods that do not irritate the digestive tract. Foods to be avoided include coarse foods, fried foods, highly seasoned foods, pastries, candies, raw fruits and vegetables, alcoholic and carbonated beverages, smoked and salted meats or fish, nuts, olives, avocados, coconut, whole-grain breads and cereals, and usually, coffee and tea. It is used for patients with ulcers, colitis, and other diseases of the digestive system.

## LOW-RESIDUE DIET

A **low-residue diet** eliminates or limits foods that are high in bulk and fiber. Examples of such foods include raw fruits and vegetables, whole-grain breads and cereals, nuts, seeds, beans, peas, coconut, and fried foods. It is used for patients with digestive and rectal diseases, such as colitis or diarrhea.

## OTHER DIETS

Other therapeutic diets that restrict or increase certain nutrients may also be ordered. The health care worker should always check the prescribed

## TODAY'S RESEARCH: TOMORROW'S HEALTH CARE

### *A daily pill that prevents heart attacks and strokes?*

Heart disease is the main cause of death in the United States. The American Heart Association estimates that in the United States alone, 70.1 million people have some form of cardiovascular (heart and blood vessel) disease. Each year more than 1 million people have a heart attack. More than 800,000 people die of heart disease. Stroke is the third largest cause of death in the United States. Each year about 700,000 people have a stroke; of these, almost 275,000 die.

In Europe, researchers are evaluating a pill that will reduce heart attacks and strokes by almost 80 percent. It has been called a “super vitamin” because it is a once-daily pill. The pill contains six different types of medicines: aspirin, a cholesterol-lowering drug, three blood pressure-lowering drugs, and folic acid. Aspirin is used to regulate the level of platelets (blood cells that aid in the clotting of blood). Cholesterol is a type of fat found in animal products. Its presence in high amounts can cause fatty deposits on the walls of blood vessels. The three blood pressure-lowering drugs are used in small amounts, but each has a different way to reduce blood pressure. Folic acid, a vitamin, is used to reduce the amount of a protein that may contribute to blocked arteries.

The current problem is to ensure that all of the combined ingredients do not cause other chemical reactions. The drug must be stable over a period of time, and care must be taken so that the products do not break down or deteriorate. Researchers are also experimenting with the “ideal” amount of each ingredient. It may even be necessary to create “super pills” with different amounts of the six ingredients to account for individual differences. However, if these problems can be solved, people could stay much healthier by taking one “super vitamin” each day. Thousands of lives could be saved each year through the prevention of heart attacks and strokes.

diet and ask questions if foods seem incorrect. Every effort should be made to include foods the patient likes if they are allowed on a particular diet. If a patient will not eat the foods on a prescribed therapeutic diet, the diet will not contribute to good nutrition.

**STUDENT:** *Go to the workbook and complete the assignment sheet for Chapter 11, Nutrition and Diets.*

## CHAPTER 11 SUMMARY

An understanding of basic nutrition is essential for health care workers. Good nutrition helps maintain wellness, a state of good health with optimal body function.

Essential nutrients are used by the body to perform many different functions. There are six groups of essential nutrients: carbohydrates, fats, proteins, vitamins, minerals, and water.

Daily food intake should provide an individual with proper amounts of the essential nutrients.

Before the body can obtain the essential nutrients from food, the body must digest the food. After digestion, the nutrients are absorbed and carried by the circulatory system to every cell in the body. Metabolism then occurs, and the nutrients are used by cells for body functions.

The simplest guide for planning healthy meals that provide the required essential nutrients is to eat a variety of foods from the five major food groups. Portion sizes should vary according to the individual's caloric requirements. Maintaining healthy weight, choosing foods low in fat, using sugar and salt in moderation, and limiting alcoholic beverages are also important aspects of proper nutrition.

Weight management is used to achieve and maintain the desired body weight. The major conditions that occur because of poor nutrition and improper exercise are underweight, overweight, and obesity. Careful control of caloric intake and regular physical exercise are the key

methods for obtaining and maintaining normal weight, or body weight that is in proportion to body height. Good weight management reduces the risk factor for many diseases and allows an individual to enjoy a longer and healthier life span.

Therapeutic diets are modifications of the normal diet. They are used to improve specific health conditions. Examples of therapeutic diets include liquid, diabetic, calorie-controlled, low-cholesterol, fat- or sodium-restricted, high- or low-protein, and bland diets. An understanding of these diets will allow the health care worker to encourage patients to follow prescribed diets.

## INTERNET SEARCHES

Use the suggested search engines in Chapter 12:4 of this textbook to search the Internet for additional information on the following topics:

1. *Nutritional status*: search words such as nutrition, diet, and nutritional status
2. *Diseases*: search for more detailed information on nutritional diseases such as hypertension, atherosclerosis, osteoporosis, and malnutrition
3. *Essential nutrients*: search for information on daily nutritional requirements for nutrients such as carbohydrates, proteins, lipids or fats, vitamins, and minerals
4. *Utilization of nutrients*: search for information on the processes of digestion, absorption, and metabolism
5. *Food energy*: use words such as weight loss, weight gain, and diet to learn more about weight control by proper nutrition
6. *Organizations*: obtain additional information on nutrition from organizations such as the U.S. Department of Agriculture and the American Dietetic Association
7. *Therapeutic diets*: determine foods allowed or foods that must be avoided in diabetic, calorie-controlled, low-cholesterol, fat-restricted, sodium-restricted, low-residue, bland, and high- or low-protein diets

## REVIEW QUESTIONS

1. List the six (6) essential nutrients and the main function of each nutrient.
2. Differentiate between digestion, absorption, and metabolism.
3. What is BMR?
4. List all of the foods you have eaten today. Be sure to include all snacks. Compare your list with the recommended daily intake of various foods from *My Pyramid*. Is your diet adequate or deficient? Explain why.
5. Differentiate between overweight and obesity. List six (6) conditions that can develop as a result of obesity.
6. What is BMI? Calculate your BMI.
7. Calculate the number of calories you require per day to maintain your present weight. How many calories should you ingest per day to gain one pound per week? How many calories should you ingest per day to lose one pound per week?
8. Identify the type of therapeutic diet that may be ordered for patients with the following conditions:
  - a. gallbladder or liver disease
  - b. diabetes mellitus
  - c. hypertension or heart disease
  - d. ulcers, colitis, or diseases of the digestive tract
  - e. pregnant or lactating women
  - f. severe nausea, vomiting, and/or diarrhea