Marcia Schwartz, CMA (AAMA), is employed by an internal medicine practice in her hometown. She recognizes that many of the patients seen in the practice have diseases that are influenced by diet and lifestyle factors. She learned about the importance of good nutrition and wellness in her medical assisting program.

In addition, Marcia has continued to attend workshops and read about current trends in nutrition, so she is prepared to provide assistance to her patients as directed by the physician.

While studying this chapter, think about the following questions:

- How can Marcia help her patients understand the importance of and suggested requirements for the primary nutrients?
- What should Marcia know about dietary guidelines for fat consumption?
- What is the importance of vitamins and nutrients, and in what foods can they be found?
- How can Marcia educate patients about the Food Guide Pyramid?
- Is Marcia able to teach patients the significance of the body mass index (BMI) and how it can be calculated?
- What are the general guidelines for therapeutic nutrition?
- Is it important that Marcia be able to teach patients how to read food labels?
- What factors contribute to a healthy lifestyle?

**Learning Objectives**

1. Define, spell, and pronounce the terms listed in the vocabulary.
2. Apply critical thinking skills in performing the patient assessment and patient care.
3. Recognize the impact of cultural influences on dietary choices.
4. Analyze the relationship between poor diet and lifestyle choices and the risk of developing diet-related diseases.
5. Classify the types and functions of dietary nutrients.
6. Describe the role of carbohydrates, fats, and protein in the daily diet.
7. Explain the function of appropriate amounts of vitamins, minerals, and water in the diet.
8. Apply the guidelines of the Food Guide Pyramid to dietary recommendations for patients.
10. Correlate a patient’s calculated BMI with the risk for diet-related disease.
11. Compare the concepts of therapeutic nutrition.
12. Interpret food labels and their application to a healthy diet.
13. Demonstrate to the patient how to read nutrition labels on food products.
15. Define the concepts of health promotion.
16. Describe the role of the medical assistant in nutrition and health promotion.
**VOCABULARY**

**amino acids** The organic compounds that form the chief constituents of protein and are used by the body to build and repair tissues.

**cholesterol** (kuh-les'-tuhr-rol) A substance produced by the liver and found in animal fats that can produce fatty deposits or atherosclerotic plaques in blood vessels.

**deficiencies** (di-fi'-shun-ses) Conditions that result with below normal intake of particular substances.

**diabetes mellitus type 1** A disease in which the beta cells in the pancreas no longer produce insulin. The individual must rely on daily insulin administration to use glucose for energy and prevent complications.

**diabetes mellitus type 2** A disease in which the body is unable to use glucose as energy as a result of inadequate insulin production in the pancreas or resistance to insulin on the cellular level.

**digestion** The process of converting food into chemical substances that can be used by the body.

**diverticulosis** (di-vuhr-ti-kyuhr-lo'-suh) The presence of pouchlike herniations through the muscular layer of the colon.

**free radicals** Compounds with at least one unpaired electron, which makes the compound unstable and highly reactive. Free radicals are believed to damage cell components, ultimately leading to cancer, heart disease, or other diseases.

**hydrogenated** (hi-drahn'-juh-nah-ted) Combined with, treated with, or exposed to hydrogen.

**macular degeneration** A progressive deterioration of the macula of the eye that causes loss of central vision.

**neural tube defects** Any of a group of congenital anomalies involving the brain and spinal column that are caused by failure of the neural tube to close during embryonic development.

**obesity** An excessive accumulation of body fat; defined as a body mass index (BMI) of 30 or higher.

**osteoarthritis** (ah-stee-oh-ar-thri-tis) Loss of bone density; lack of calcium intake is a major factor in its development.

**psyllium** (si-lum) A grain found in some cereal products, in certain dietary supplements, and in certain bulk fiber laxatives; a water-soluble fiber.

**registered dietitian** (RD) An individual with a minimum of a bachelor’s degree in food and nutrition who is concerned with the maintenance and promotion of health and the treatment of diseases through diet.

**triglyceride** (tri-glir-sid) A fatty acid and glycerol compound that combines with a protein molecule to form high- or low-density lipoprotein.

**turgor** A term referring to normal skin tension; it is the resistance of the skin to being grasped between the fingers and released. Turgor is decreased with dehydration and increased with edema.

**vertigo** Dizziness; a sensation of faintness or an inability to maintain normal balance.

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Good health is a state of emotional and physical well-being that is determined to a large extent by diet and lifestyle factors. Health promotion and disease prevention practices focus on sound nutrition, regular exercise, avoidance of smoking and tobacco, limited alcohol intake, management of stress, and avoidance of environmental contaminants. We are what we eat, because the food we consume is used to build and repair every part of our bodies. A well-nourished person is also better able to ward off infections. Consequently, a poor diet and risky lifestyle behaviors are directly related to multiple health problems.

The physician, the medical assistant, and the registered dietitian (RD) are all closely involved in the nutritive care of a patient. The physician prescribes the diet, and ideally the dietitian instructs the patient in how to follow it. If professional aid is not available, the medical assistant may be asked to discuss the diet with the patient, answer questions, and explain certain aspects of the modifications involved. The patient may hesitate to ask the physician details about a recommended diet, or he or she may call with questions about how to implement the diet after leaving the office. The medical assistant, therefore, frequently is the person to whom the patient turns for answers. You should be able to answer basic questions on healthy nutrition and should have a fundamental knowledge of the diets physicians most often prescribe.

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**HEALTH PROBLEMS RELATED TO POOR NUTRITION AND LIFESTYLE FACTORS**

- **Anemia:** Low iron or folate intake
- **Cancers:** High-fat, low-fiber, low-complex-carbohydrate diet; high alcohol and sodium intake; sedentary lifestyle; tobacco use
- **Constipation:** Low fiber, inadequate fluids; high-fat diet; sedentary lifestyle
- **Diabetes mellitus type 2:** High-calorie, high-fat, low-complex-carbohydrate diet; obesity; sedentary lifestyle
- **Hypercholesterolemia and atherosclerosis:** High-fat, low-fiber diet; high sugar and alcohol intake; tobacco use; sedentary lifestyle
- **Hypertension:** High-calorie, high-fat diet; high alcohol and sodium intake; tobacco use; sedentary lifestyle; obesity; stress
- **Osteoporosis:** Low calcium intake; inadequate vitamin D intake or lack of sun exposure; high alcohol intake; sedentary lifestyle; tobacco use
- **Stroke:** High-fat, low-fiber, low-complex-carbohydrate diet; high alcohol intake; tobacco use; stress

People eat the way they do for many reasons. When encouraging patients to make significant changes in their diets, the medical assistant must be sensitive to these reasons. The choices people make about what they eat are greatly influenced by their background.
ground and relationships. Every culture, religion, and ethnic group has its own beliefs and practices with regard to food. For example, according to the Hindu religion, eating beef is forbidden. Certain Jewish practices govern the types of foods that are eaten and how they are prepared. Food is more than sustenance; it represents family and celebrations and has an entire psychological component that the medical assistant must recognize in order to care for the individual patient most effectively.

**REASONS FOR PEOPLE’S FOOD CHOICES**

- **Convenience:** People choose what’s easiest and quickest, including eating out and take-home meals.
- **Cost:** What a person can afford.
- **Emotional comfort:** “Feel good” foods are chosen based on cultural and psychological influences.
- **Routine:** People eat what they always eat out of habit, personal preference, and availability.
- **Positive experiences:** A food is associated with a fond memory, eaten by someone the person admires, or chosen because of the influence of marketing and advertising.
- **Ethnic or regional influences:** The person grew up with the food; it is associated with the individual’s cultural background; or it is part of the regional diet where the person lives.
- **Health and weight:** People think a particular food is good for them or will help them maintain or lose weight.

**CULTURAL EATING PATTERNS**

- **Asian diets** emphasize whole grains in the form of millet, rice, and noodles, as well as fruits, vegetables, legumes, and nuts and seeds; fats are derived largely from vegetable oils, such as peanut or sesame oils. Dairy products are not traditionally eaten. Protein sources typically are broiled or stir-fried fish and seafood, egg whites, tofu, and nuts.
- **Latin American diets** emphasize food from plant sources at each meal, especially maize (corn) and potatoes, as well as fruits, vegetables, whole grains, beans, and nuts. Poultry, fish, and dairy typically are consumed daily, and meats and eggs weekly.
- **Mediterranean diets** emphasize whole grains, fresh fruits and vegetables, and all types of legumes, such as beans, lentils, and peas daily; olive oil replaces other fats and oils; fish, poultry, and eggs are consumed weekly; meat monthly.
- **Mexican diets** emphasize corn or flour tortillas, cabbages, legumes, squash, tomatoes, corn, and potatoes daily. Dairy is used in the form of cheeses, but milk is not regularly consumed. Protein sources typically are fish, beef, poultry, lamb, and many types of beans.

**NUTRITION AND DIETETICS**

The term nutrition refers to all the processes involved in the intake and use of nutrients. Nutrients are the organic and inorganic chemicals in food that supply the energy and raw materials for cellular activities. Nutrients include carbohydrate, fat, protein, vitamins, minerals, and water.

**Metabolism** is the process in which nutrients are used at the cellular level for growth and energy production as well as excretion of waste. Metabolism occurs in two ways. **Anabolism** is the building phase, in which smaller molecules, such as amino acids, are combined to form larger molecules, such as proteins. An example of anabolism is the creation by the liver of glycogen, a stored form of glucose. In this process, many units of glucose are combined to form a more complex glycogen molecule. **Catabolism** is the breaking-down phase, in which larger molecules are broken down and converted into smaller units, such as when stored glycogen is broken down into glucose molecules for energy.

**Digestion** is a combination of mechanical and chemical processes that occur in the mouth, stomach, and small intestine. These processes result in the breakdown of nutrients into absorbable forms, including amino acids, fatty acids, glyceral, and glucose. Most nutrients are absorbed in the small intestine and then carried by the bloodstream to all parts of the body.

The term nutrition also is used to indicate nutritional status, or the condition of the body resulting from the use of nutrients. **Dietetics** is the practical application of nutritional science to individuals. It is the combined science and art of feeding individuals or groups, given a wide range of economic factors and/or health conditions, according to the principles of nutrition and dietary management. A registered dietitian’s role is the promotion of good health through proper diet and the therapeutic use of diet in the treatment of disease.

**Nutrients**

To nurture life, the nutrients in food must perform one or more of three basic functions in the body: (1) provide a source of fuel or energy, (2) supply material to build and repair tissues, and (3) regulate metabolic processes. Because no one food supplies all the nutrients required, a combination of different foods is necessary to promote health. With a little planning, all the body’s needs can be met by a well-balanced diet. Dietary deficiencies result in undernourishment or malnourishment and may lead to a variety of diseases. Good nutrition is an important part of health promotion for all individuals but especially for pregnant women, young children, and the elderly.

The role of diet in supplying energy is crucial to body functions. Every action of the body, whether voluntary or involuntary, requires energy. Even when a person is asleep, the body still needs a source of energy to keep vital organs functioning. **Basal metabolism** is the amount of energy needed to maintain essential body functions. The **basal metabolic rate** (BMR) is the amount of energy used by a fasting, resting individual to maintain vital functions. The rate is determined by the amount of oxygen used and is defined in units of heat energy called calories (cal). Because this unit represents a relatively small amount of energy and because metabolism involves much larger amounts of energy, the large calorie (Cal), or kilocalorie (kcal), is commonly used. A kilocalorie is defined as the amount of heat required to raise the temperature of 1 kg of water 1° C.

Of the seven food constituents (carbohydrates, proteins, fats, water, minerals, vitamins, and fiber), only carbohydrates, pro-
teins, and fats are capable of furnishing the body with energy. The amount of energy, or kilocalories, a person needs varies according to the individual's activity level, basal metabolic requirements, and whether disease is present. Most adults age 20 to 40 require 1,800 to 2,200 kcal/day. A patient generally is said to be overweight or underweight depending on how his or her current weight compares with nutritional assessment standards. Obesity is likely to result when more calories are consumed than are expended or because of certain endocrine imbalances.

Nutrients can be categorized as those that are a required part of the diet and those that can be anabolized in the body. An essential nutrient cannot be manufactured by the body and therefore must be included in the diet or a deficiency disease occurs. Certain amino acids are examples of essential nutrients. A nonessential nutrient can be created in the body and therefore does not need to be included in the diet; for example, both cholesterol, which is manufactured in the liver, and vitamin D, which is synthesized from exposure to sunlight, are nonessential nutrients.

### Nutrient Components

#### Carbohydrates

Carbohydrates (CHO) are chemical organic compounds composed of carbon, hydrogen, and oxygen that are primarily plant products. They are divided into three groups based on the complexity of their molecules: simple sugars (e.g., table sugar, molasses, syrup, honey, candy, baked goods, and milk); complex carbohydrates (starch) (e.g., whole-grain products, cereal, pasta, rice, potatoes, legumes, fruits, vegetables, and seeds); and dietary fiber, which is found in bran, oatmeal, whole-grain breads, beans, fruits, vegetables, seeds, and dried fruits. Each has a function in health and consists of many variations. With the exception of fiber, carbohydrates are easily digested and absorbed into the body. Simple sugars are quickly absorbed, whereas complex carbohydrates must be processed before they can be absorbed in the intestinal tract. Dietary fiber is indigestible and passes through the gastrointestinal tract unchanged.

The main function of carbohydrates is to supply fuel for energy and for all basic cellular activities. To meet energy needs, carbohydrate is metabolized at a rate of 4 kcal/g. When digested, carbohydrate is converted into glucose, which is carried by the bloodstream to cells that need energy. A small amount of concentrated glucose is stored in the liver and muscles as glycogen. This stored glucose is available to supplement dietary supplies of carbohydrate. As with all nutrients, excess amounts of carbohydrate are converted into fat and stored in the body as adipose tissue. In addition to serving as the body's primary energy source, carbohydrate also is needed to regulate protein and fat metabolism. As long as sufficient amounts of dietary carbohydrate are available to meet the body's energy needs, protein and fat are not needed to supply energy. This protein-sparing effect allows protein to be used for its intended purpose—the repair and growth of tissues.

Carbohydrate is used for energy with limited production of waste materials, whereas protein and fat metabolism creates byproducts that are challenging for the body to process and excrete. For example, the metabolizing fat for energy results in the production of ketone bodies, which can cause an increase in the acidity of the blood and possibly kidney damage from the excretion of ketones. In addition, the central nervous system (CNS) requires a constant minute-to-minute supply of glucose to function properly. Neurons find it difficult to use fat or protein for energy.

Dietary fiber, commonly called roughage, is the portion of a plant that cannot be digested or absorbed. However, fiber's inability to be digested makes it an important dietary asset. Fiber adds bulk to the intestinal tract that stimulates peristalsis and promotes regular bowel movements. In addition, soluble fiber, which is found in oat bran, peas, beans, certain fruits, and psyllium, lowers blood cholesterol levels, reducing the risk of heart disease. Soluble fiber combines with cholesterol in the intestine and is excreted through the bowel, which prevents the absorption of cholesterol into the bloodstream. Insoluble fiber, which is found in whole grains and beans, promotes regular bowel movements, which prevents constipation and hemorrhoids. It also prevents diverticulosis by stimulating and toning the muscles lining the large intestine, and it is thought to help prevent colon cancer. The recommended daily fiber intake is 20 to 35 g, and 5 to 10 g of this should be soluble fiber. Table 30-1 identifies food sources of both soluble and insoluble fiber. Eating fruit unpeeled and eating raw vegetables can greatly increase the fiber content of the diet.

**Recommendations for Carbohydrate Consumption.**

- Carbohydrates should account for 55% to 57% of the total calories consumed each day (i.e., 271 to 288 g for a 2,000-calorie diet).
## Table 30-1 Food Sources of Fiber

<table>
<thead>
<tr>
<th>FOOD</th>
<th>SERVING SIZE</th>
<th>TOTAL FIBER (g)</th>
<th>SOLUBLE FIBER (g)</th>
<th>INSOLUBLE FIBER (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spaghetti, cooked</td>
<td>1 cup</td>
<td>2</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Whole-wheat bread</td>
<td>1 slice</td>
<td>2.5</td>
<td>0.5</td>
<td>2</td>
</tr>
<tr>
<td>White rice, cooked</td>
<td>½ cup</td>
<td>0.5</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>Bran flake cereal</td>
<td>3/4 cup</td>
<td>5.5</td>
<td>0.5</td>
<td>5</td>
</tr>
<tr>
<td>Corn flake cereal</td>
<td>1 cup</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Oatmead, cooked</td>
<td>3/4 cup</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Banana</td>
<td>1 medium</td>
<td>2</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Apple, with skin</td>
<td>1 medium</td>
<td>3</td>
<td>0.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Orange</td>
<td>1 medium</td>
<td>2</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Pear, with skin</td>
<td>1 medium</td>
<td>4.5</td>
<td>0.5</td>
<td>4</td>
</tr>
<tr>
<td>Strawberries</td>
<td>3/4 cup</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Broccoli</td>
<td>3/4 cup</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Corn</td>
<td>3/4 cup</td>
<td>1.5</td>
<td>0</td>
<td>1.5</td>
</tr>
<tr>
<td>Potato, baked with skin</td>
<td>1 medium</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Spinach</td>
<td>3/4 cup</td>
<td>2</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Kidney beans</td>
<td>3/4 cup</td>
<td>4.5</td>
<td>1</td>
<td>3.5</td>
</tr>
<tr>
<td>Popcorn</td>
<td>1 cup</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>


- Fiber-rich fruits, vegetables, and whole grains should be eaten as often as possible.
- People should consume 15 g of fiber for every 1,000 calories eaten.
- The intake of simple sugars, especially sugar-sweetened drinks should be reduced, and snacking on foods high in sugars and starches should be limited.
- Fruits and vegetables: Based on the typical 2,000-calorie diet, 2 cups of fruit and 2 ½ cups of vegetables should be eaten daily; a variety of dark green, orange, and starchy vegetables and legumes should be consumed.
- Whole grains: At least three 1-ounce servings should be eaten each day. Whole grains should make up at least half of the daily grain consumption. One ounce is equal to one slice of bread, 1 cup of dry cereal, or ½ cup of cooked rice, pasta, or cereal.
- Milks: Adults should consume 3 cups of fat-free or low-fat milk or milk products each day. Children age 2 to 8 years should have 2 cups a day, and those 9 years or older should have 3 cups. One cup is equal to 1 cup of yogurt, 1 ½ ounces of natural cheese, or 2 ounces of processed cheese.

### Critical Thinking Application 30-1

A patient, George Hawthorne, recently was diagnosed with hypertension and hypercholesterolemia. He has a family history of colon cancer. The physician recommends a high-fiber diet. Describe how Marcia could reinforce the physician's information by explaining the purpose of dietary fiber, the difference between soluble and insoluble fibers, and the types of foods Mr. Hawthorne should include in his diet.

### Fats

Fats are the storage form of fuel used to back up carbohydrates as an available energy source. Fat is a much more concentrated form of fuel, producing 9 kcal of energy per gram when metabolized. Dietary fats, or lipids, provide essential fatty acids and are needed for the absorption of the fat-soluble vitamins, A, D, E, and K. Fat gives food flavor and creates a feeling of satiety or satisfaction after eating. Adipose tissue, the stored form of fat in the body, supports and protects vital organs, insulates the body to help in the regulation of body temperature, and plays an important role in protecting nerve fibers and relaying nerve impulses. Lipids are also crucial to cell membrane development.

**Saturated and Unsaturated Fatty Acids.** When digested, fats are broken down into fatty acids and glycerol. The major building blocks of fat are fatty acids, which can be either saturated or unsaturated. Unsaturated fatty acids can take on more hydrogen under the proper conditions and therefore are less heavy and less dense. If fatty acids have one unfilled hydrogen bond, the fat is called monounsaturated. Oils and olive oil, peanuts and peanut oil, canola oil, pecans, and avocados contain monounsaturated fats. Polyunsaturated fats, such as safflower, corn, cottonseed, and soy oils, have two or more unfilled hydrogen bonds. Unsaturated fats are found in plants and are usually liquid at room temperature. Monounsaturated fat should be used as frequently as possible to replace saturated fat in the diet. Research on olive oil indicates it may offer some protection against heart disease and breast cancer, and canola oil is another rich source of monounsaturated fatty acids.

The chemical structure of a saturated fatty acid contains all the hydrogen possible; these fats, therefore, are denser, heavier,
and solid at room temperature. Saturated fats are found in dairy products, eggs, lard, meat, and hydrogenated fats, such as margarine. Some saturated fats, such as those in soft margarines, are partially hydrogenated. These fats usually are soft at room temperature. Most saturated fats come from animal sources. The main exceptions are coconut and palm oils, which are of plant origin but are exceptionally high in saturated fat. The primary dietary factor associated with high blood cholesterol levels is a high intake of foods high in saturated fat.

**WHAT IS A TRANS FAT?**

Trans-fatty acids are byproducts created when polyunsaturated oils are solidified by the addition of hydrogen. Manufacturers use this process to preserve food products, because they are much more resistant to rancidity after hydrogenation. This lengthens the shelf life of the processed food, and the product tastes better. Trans fats are found naturally in meat and dairy products, but Americans consume most of their trans fats in processed foods, such as margarine, crackers, cookies, doughnuts, biscuits, chips, frozen meals, french fries, and other items containing or fried in partially hydrogenated oils. Trans fats raise the level of low-density lipoprotein (LDL), the so-called bad cholesterol, and lower the level of high-density lipoprotein (HDL), or “good” cholesterol, in the blood. Scientific evidence indicates that saturated fat, trans fat, and dietary cholesterol combine to raise the LDL level, resulting in an increased risk of coronary heart disease (CHD). According to the National Institutes of Health, more than 12.5 million Americans have CHD, and more than 500,000 die from its complications each year. Since 1993, nutritional food labels have been required to list the amounts of saturated fat and dietary cholesterol in products. Since January 2006, manufacturers also have had to include trans fats on the label if the amount exceeds 0.5 g per serving. Label readers should be cautious, however, because eating more than the designated serving size can drastically increase the amount of trans fats consumed.

**BENEFITS OF OMEGA-3 FATTY ACIDS**

The omega-3 fatty acids have a number of beneficial effects in the body:

- They are present in large amounts in the cerebral cortex.
- They help form the retina.
- They have antiinflammatory effects, including improving the immune response, protecting blood vessels (e.g., the coronary arteries), and inhibiting the formation of blood clots.

Omega-3 fatty acids are found in cold water fish, including mackerel, salmon, tuna, and trout; in certain oils, including canola, flaxseed, soybean, and wheat germ oil; and in walnuts, soybeans, and soybean kernels. The benefits of omega-3 fatty acids can be obtained by consuming two servings of cold water fish weekly.

Foods High in Saturated Fat. Even a fat-free food can become high in saturated fat, depending on how it is prepared (e.g., a fat-free potato cooked as French fries). Therefore, we not only need to lower our intake of foods with saturated fat, we also need to be cautious about how foods are prepared. Foods should be grilled, roasted, broiled, baked, or cooked in the microwave rather than fried. Only lean meats should be used, and visible fat should be cut off before eating. Low-fat or fat-free products should be substituted when possible. Some foods high in saturated fat include the following:

- Whole-milk dairy products
- Oil-packed fish
- Whole-milk cheeses
- Salad dressing
- Butter
- Mayonnaise
- Cream
- Meat (especially red meat)
- Ice cream
- Coconut and palm oils
- Egg yolks

A triglyceride molecule is created when three fatty acids attach to a molecule of glycerol. This structure is the main storage form of lipids. Triglyceride molecules are transported throughout the body via the bloodstream as lipoproteins. Dietary fats determine the saturation level of triglyceride chains. The total amount of triglycerides in the blood is used as a diagnostic tool for determining a patient’s risk for hypertension and heart disease. The acceptable triglyceride range in men is 40 to 160 mg/dL; in women, it is 35 to 135 mg/dL.

**Cholesterol.** Cholesterol is a nonessential nutrient that plays a vital role in metabolic activities. It is synthesized only in animal tissue, so it is not found in plant foods. The primary food sources of cholesterol are egg yolks and organ meats, although all animal sources of food contain cholesterol. As a nonessential nutrient, cholesterol also is manufactured in the body, particularly in the liver.

The confusion between “good” and “bad” fats stems from the distinction between the fat in food and the fat in our bodies. The good fats in our diet are monounsaturated and polyunsaturated fats. The bad dietary fats are cholesterol, trans fats, and saturated fats. The fat in our bodies is divided into two lipoprotein categories. The good fats, or high-density lipoproteins (HDL), carry cholesterol from body tissues or the bloodstream to the liver for metabolism and excretion. The bad fats, or low-density lipoprotein (LDL) and very-low-density lipoprotein (VLDL), carry cholesterol to the cells. LDL and VLDL form atherosclerotic plaques on arterial walls, and these plaques frequently result in heart disease, hypertension, and strokes. However, serum LDL levels often can be successfully changed through diet. Using polyunsaturated and monounsaturated fat products reduces total serum cholesterol levels. In addition, using monounsaturated fats (olive, peanut, and canola oils) reduces LDL levels. Aerobic exercise is an important tool for lowering total serum cholesterol levels, increasing HDL levels, and reducing triglycerides. The higher the serum level of HDL, the greater the protection against cardiovascular disease. The normal HDL range is 30 to 80 mg/dL. A level below 40 is considered a major risk for heart disease, whereas a value of 60 or greater is thought to protect against heart disease. Heart experts recommend an LDL level below 100 mg/dL and an HDL level of 60 mg/dL or greater (Table 30-2).

Another potential health risk from a high-fat diet is obesity. Too much fat in the diet is deposited in the body as stored adipose tissue. Currently fats make up 35% to 40% of the total
TABLE 30-2 Total and Low-Density Lipoprotein (LDL) Cholesterol Level Recommendations

<table>
<thead>
<tr>
<th>AGE (yr)</th>
<th>TOTAL CHOLESTEROL (mg/dl)</th>
<th>LDL CHOLESTEROL (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACCEPTABLE</td>
<td>BORDERLINE</td>
</tr>
<tr>
<td>2 to 20</td>
<td>&lt;170</td>
<td>170-199</td>
</tr>
<tr>
<td>&gt;20</td>
<td>&lt;200</td>
<td>200-239</td>
</tr>
</tbody>
</table>

calories in the American diet. Nutritionists and epidemiologists believe that reducing dietary fat to 30%, with saturated fat and trans fat making up no more than 10% of calories, would reduce the risks of cancer, atherosclerosis, hypertension, and heart disease.

Recommendations for Fat Consumption
- Keep total fat intake to 20% to 35%, or at approximately 17 g of fat per day for a 2,000-calorie diet.
- No more than 10% of daily calories should come from saturated and trans fats.
- Limit cholesterol to less than 300 mg/day.
- Use only lean cuts and smaller portions of meat; trim visible fat.
- Substitute poultry and fish for red meat; remove poultry skin before eating.
- Avoid adding fat in the cooking process.
- Limit intake of organ meats and egg yolks.
- With elevated serum cholesterol, limit eggs to two or three per week or use egg substitutes or egg whites only.
- Use low-fat or fat-free milk and milk products.
- Use low-fat or fat-free products.
- Choose liquid monounsaturated oils, such as canola or olive oil.

CRITICAL THINKING APPLICATION 30-2
Mr. Hawthorne is attempting to control his hypercholesterolemia with diet and exercise. What recommendations about fat intake can Marcia make that will help him lower his total cholesterol and LDL levels and raise his HDL level?

Antioxidants. Cholesterol has been high on the list of dietary villains for years and is thought to be a serious contributor to the development of heart disease. Recent studies indicate that the problem may lie not with the cholesterol itself but with the way it reacts with oxygen, or the process of oxidation, in the bloodstream. The normal body process of using oxygen for energy, combined with environmental factors, such as pollution and tobacco smoke, creates free radicals, which can cause cellular damage. Our bodies have developed mechanisms to protect us against oxidizing free radicals through the use of antioxidant vitamins C, E, and beta-carotene, but their amounts are not always sufficient. When enough antioxidants are circulating in the blood, cholesterol is prevented from oxidizing. If the level of antioxidants is insufficient, the opposite is true, and damage to arteries begins. Therefore, in addition to lowering cholesterol, saturated fat, and trans fat intake, increasing dietary intake of antioxidants may prove beneficial in preventing cardiovascular disease. Research indicates that a diet rich in antioxidant vitamins also may be linked to protection against some cancers and macular degeneration. Naturally occurring antioxidants are found in many fruits and vegetables and certain seasonings.

FOODS THAT CONTAIN ANTIOXIDANTS

Vitamin C  
- Broccoli  
- Cabbage  
- Cauliflower  
- Grapefruit  
- Lemons  
- Oranges  
- Peppers  
- Strawberries  
- Tangerines

Beto-Carotene  
- Apricots  
- Broccoli  
- Cantaloupe  
- Carrots  
- Kale and spinach  
- Mustard greens  
- Pumpkin  
- Sweet potatoes  
- Winter squash

Vitamin E  
- Almonds  
- Chick peas  
- Oatmeal  
- Soy beans  
- Sunflower seeds  
- Wheat germ

Mixed Antioxidants  
- Cloves  
- Green tea  
- Oregano  
- Rice  
- Rosemary  
- Sesame  
- Thyme  
- Wheat bran  
- Wine

Proteins
Proteins are very large, complex molecules. They are composed of units known as amino acids, which are the materials the body uses to build and repair tissues. Twenty amino acids are necessary for normal growth and maintenance of tissues. Of these, eight are essential amino acids that must be included in the diet because humans do not have the enzymes necessary for their formation.

Proteins are classified according to whether they contain all essential amino acids in good proportion. Complete proteins come from animal sources and have a mixture of all eight essential amino acids. Incomplete proteins do not supply the body with all the essential amino acids. These are the vegetable proteins, which must be used in specific combinations because each is missing or extremely low in one or more of the essential amino acids.
To prevent the wasting of protein for energy and to permit the creation of needed amino acid compounds, dietary protein must be adequate; the diet must supply essential amino acids, and enough carbohydrate and fat must be consumed to prevent the burning of protein for energy. Fortunately, most foods have a mixture of proteins that supplement one another. Because little, if any, storage of amino acids occurs in the body, it is important that a source of protein be included at each meal. Patients with extensive burns or those with wound healing problems often are prescribed high-protein diets to encourage tissue regeneration. Healthy adult women need approximately 45 g of protein a day, and men need approximately 55 to 60 g. The average North American diet contains twice that amount. Excess protein is metabolized and either converted to glucose, burned as fuel, or stored as fat in adipose tissue.

Functions of Protein
- Builds and repairs body tissue, including new tissue, blood, enzymes, and hormones
- Aids the body’s defense mechanisms against disease by creating antibodies
- Regulates fluid and electrolyte balance
- Provides energy when carbohydrate and fat stores are depleted

Food Sources of Protein
- Complete proteins: Meat, fish, poultry, eggs, and dairy products
- Incomplete proteins: Whole grains (e.g., barley, bulgur, commeed, oats, rice, whole-grain breads), cashews, sesame seeds, sunflower seeds, walnuts; soy products, dried legumes, peanuts; broccoli, dark green, leafy vegetables

Recommendations for Protein Consumption
- Consume no more than 18% of daily calories from protein or approximately 91 g of protein per day for a 2,000-calorie diet.
- The U.S. Department of Agriculture (USDA) Food Guide recommends eating 5½ to 6 ounces of cooked lean meat, poultry, or fish each day.
- One ounce of meat equals one egg, ⅓ cup of dry beans, 1 tablespoon of peanut butter, ⅓ cup of cooked beans, or ½ cup of tofu.

If incomplete proteins are the only source of protein in the diet, a food that is protein deficient in one amino acid should be eaten with one that is high in the same amino acid to get the needed mix of essential amino acids. Vegetarianism has become increasingly popular, and many different forms exist. Some vegetarians consume no red meats but eat fish and poultry. Lacto-ovo-vegetarians eat primarily vegetable foods but include eggs and/or dairy products in their diets. Lacto-vegetarians consume milk and milk products in addition to vegetables but no other animal sources of food. Vegans consume no animal proteins at all, relying solely on vegetable foods for protein.

Those who eat some animal protein in the form of fish, eggs, and milk generally are not at risk nutritionally. However, vegans must include a variety of vegetable foods to ensure the nutritional adequacy of their diets. To supply sufficient protein, vegetables that complement each other must be eaten together to get the correct proportion of amino acids. This is customarily done in the diets of different cultures. For example, in Mexico, beans are combined with rice, and in Middle Eastern countries, wheat bread is combined with cheese.

Tips for vegetarians from the USDA Web site www.mypyramid.gov include the following:
- Build meals around protein sources that are naturally low in fat, such as beans, lentils, and rice, rather than high-fat cheeses.
- Try calcium-fortified, soy-based beverages in place of milk.
- Try vegetarian products such as soy-based sausage patties or links and veggie burgers made from soybeans, vegetables, and/or rice.
- Add meat substitutes, such as tempeh (cultured soybeans with a chewy texture), tofu, or wheat gluten (seitan), to soups and stews to boost protein without adding saturated fat or cholesterol.

Examples of Nutritionally Balanced Incomplete Protein Combinations
Combining two or more sources of incomplete amino acids provides a complete protein. For example:
- Black beans and rice
- Peanut butter sandwich on whole-grain bread
- Split-pea soup with whole-grain bread
- Lentil soup and cornbread
- Walnuts, peanuts, and rice
- Whole-wheat pasta, broccoli, and spinach
- Sunflower seeds and navy bean soup

Vitamins (Micronutrients)
Vitamins are organic substances that occur in minute quantities in plant and animal tissues; they are needed for specific metabolic processes to proceed normally. Vitamins function as catalysts and help or allow metabolic reactions to proceed. Originally they were lettered or numbered as they were discovered. However, as they have been identified chemically, they have been given more specific names. In many cases their chemical names are as well known as their letter designations.

Vitamins are divided into two groups: fat-soluble (A, D, E, and K) and water-soluble (B complex and C). Some vitamins are nonessential, meaning they can be manufactured in the body. Vitamin A is produced from beta-carotene food sources such as carrots, pumpkin, and sweet potatoes. Ultraviolet light from the sun initiates the production of vitamin D in the skin. Vitamin K is created from intestinal bacteria.
FUNCTIONS OF VITAMINS

- Regulate the synthesis of bone, skin, glands, nerves, brain, and blood
- Aid in the metabolism of protein, carbohydrates, and fats
- Prevent nutritional deficiency diseases
- Support good health at all ages

Vitamins do not cure an illness other than a health problem that is caused by the lack of a specific vitamin. For example, adding vitamin C to a patient’s diet does not cure bleeding gums unless the condition is specifically caused by a lack of ascorbic acid (the chemical name for vitamin C). It should also be noted that toxic symptoms from excessive ingestion of fat-soluble vitamins can occur, because these vitamins can be stored in adipose tissue. Water-soluble vitamins typically are excreted in the urine. However, a large intake of some water-soluble vitamins may cause adverse effects (Table 30-3). Nutrition experts agree that vitamins provide the greatest benefit when they are obtained through food as part of the diet rather than in supplement form. However, supplements may be needed in the following cases:
  - Patients showing signs and symptoms of a vitamin or mineral deficiency
  - Folate for women planning on becoming pregnant or in their childbearing years
  - Iron and folate for pregnant and lactating women
  - Calcium for lactose-intolerant individuals
  - Daily vitamins for the elderly, who may have difficulty chewing, have malabsorption problems, live alone, or make poor food choices
  - Postsurgical or burn patients, who require more protein and nutrients to grow and repair tissue
  - Strict vegetarians, who may need vitamins B₁₂ and D, along with iron and zinc
  - Patients who have had gastric bypass surgery, who may require multiple nutrients, including vitamin B₁₂, protein, and iron

Extensive research is underway studying the role vitamins play in disease prevention and treatment. Research indicates that antioxidant vitamins (C, E, and A) may prevent cell membrane damage that leads to cancer and heart disease. Vitamins C and E also appear to protect against the development of cataracts. Vitamin E is recommended to help prevent blood clot formation and coronary heart disease (CHD). The B vitamins may help lower LDL levels, and folic acid is recommended for women planning a pregnancy to prevent neural tube defects.

Diet also can affect the action of prescribed medications. For example, vitamin K can interfere with the action of warfarin anticoagulants. Therefore, a sudden dietary increase or decrease in vitamin K rich foods can alter how long it takes a clot to form in patients’ prescribed anticoagulant therapy. High levels of vitamin K are found in dark green, leafy vegetables such as kale, collards, Swiss chard, broccoli, and spinach; green tea; and lentils and soy beans. For stable anticoagulant treatment, patients should not increase or reduce their intake of vitamin K-rich foods without consulting their physician. They also should inform the physician if they are taking vitamin supplements that contain vitamin K.

Because vitamins and dietary supplements are regulated as food and not as drugs, no standards or regulatory mechanisms regulate their production. Therefore, various brands differ in the amount of substance available, its quality, and its level of absorption. The U. S. Pharmacopoeia (USP), an independent organization that sets standards for drugs, recently developed standards for vitamins. It is recommended that consumers look for the USP label for products that adhere to these standards.

Minerals (Electrolytes)

The human body requires minerals in relatively small amounts; nevertheless, they are absolutely essential for life (Table 30-4). Of the 19 or more minerals that form the mineral composition of the body, at least 13 are needed to maintain a healthy state. Minerals must be supplied by the diet or from supplements. Recommended daily intakes have been established for 12 minerals. Minerals contribute to the body’s water-electrolyte balance and acid-base balance and are essential components of enzymes. Minerals also help regulate muscular and nervous activities, blood clotting, and normal heart rhythm.

Food Guide recommendations for the daily intake of minerals, based on a 2,000-calorie diet, are:
  - Potassium: 4,000 mg
  - Sodium: 1,800 mg
  - Calcium: 1,300 mg
  - Magnesium: 400 mg
  - Copper: 2 mg

SODIUM, BLOOD PRESSURE, AND THE DASH DIET

Research has proved that individuals with a sodium intake of more than 2,400 mg a day have a high risk of developing hypertension. On average, adults in the United States are estimated to consume 3,300 mg of sodium per day. A healthy body excretes excess sodium through the kidneys, but sodium’s attraction for fluid can cause hypertension to develop. How can you cut down on salt intake? You should avoid pickles, olives, and sauerkraut; all processed meats (lunch meat) and processed fish, but especially those that are smoked; salty snacks; fast and processed foods; canned soups; and cheese, especially processed.

The Dietary Approaches to Stop Hypertension (DASH) diet has been recommended as a means of lowering blood pressure. Guidelines for the DASH diet include the following:
  - Four to five servings of both fruits and vegetables
  - Seven to eight servings of whole grains
  - 6 ounces or less of meat, fish, and poultry
  - Four to five servings per week of nuts, seeds, and dry beans
  - 2 to 3 cups of milk
  - 2 to 3 teaspoons of oils
  - 5 tablespoons of added sugar per week
  - 1,500 to 2,000 mg of sodium per day
  - Total fat should not exceed 22% of calories

Text continued on p. 362
<table>
<thead>
<tr>
<th>VITAMIN</th>
<th>U.S. RDA*</th>
<th>BEST SOURCES</th>
<th>FUNCTIONS</th>
<th>DEFICIENCY SYMPTOMS/</th>
<th>TOXIC</th>
<th>PROCESSING TIPS</th>
<th>DID YOU KNOW?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (carotene)</td>
<td>5,000 IU/day</td>
<td>Yellow or orange fruits and vegetables; green, leafy vegetables; fortified oatmeal; liver; dairy products</td>
<td>Formation and maintenance of skin, hair, and mucous membranes; aids vision in dim light; bone and tooth growth</td>
<td>Night blindness; dry, scaly skin; frequent fatigue</td>
<td>Yes, in high doses, but beta-carotene is nontoxic</td>
<td>Serve fruits and vegetables raw and keep covered and refrigerated; steam vegetables; broil, bake, or braise meats.</td>
<td>Low-fat and skim milk often is fortified with vitamin A, which is removed with the fat.</td>
</tr>
<tr>
<td>B₁ (thiamine)</td>
<td>1.5 mg/day</td>
<td>Fortified cereals and oatmeal, meat, rice and pasta, whole grains, liver</td>
<td>Helps the body release energy from carbohydrates during metabolism; growth and muscle tone</td>
<td>Heart irregularity, fatigue, nerve disorders, mental confusion</td>
<td>No, high doses are excreted by the kidneys</td>
<td>Do not rinse rice or pasta before and after cooking. Cook in minimal water.</td>
<td>Pasta and breads made of refined flours have B₁ added because it is lost in the milling process.</td>
</tr>
<tr>
<td>B₂ (riboflavin)</td>
<td>1.7 mg/day</td>
<td>Whole grains; green, leafy vegetables, organ meats, milk; eggs</td>
<td>Helps the body release energy from protein, fat, and carbohydrates during metabolism</td>
<td>Cracks in the corners of the mouth, rash, anemia</td>
<td>No toxic effects reported</td>
<td>Store food in containers that light cannot penetrate; cook vegetables in minimal water; roast or broil meats.</td>
<td>Most ready-to-eat cereals are fortified with 25% of the U.S. RDA for B₂.</td>
</tr>
<tr>
<td>B₆ (pyridoxine)</td>
<td>2 mg/day</td>
<td>Fish, poultry, lean meats, bananas, prunes, dried beans, whole grains, avocados</td>
<td>Helps build body tissue and aids metabolism of protein</td>
<td>Convulsions, dermatitis, muscle weakness, skin cracks, anemia</td>
<td>Long-term megadoses may cause nerve damage in hands and feet</td>
<td>Serve fruits raw or cook for shortest time in little water; roast or broil meats.</td>
<td>Because B₆ aids in the use of protein in the body, the need for it increases with protein intake.</td>
</tr>
<tr>
<td>B₁₂ (cobalamin)</td>
<td>6 mcg/day</td>
<td>Meats, milk products, seafood</td>
<td>Aids cell development, functioning of the nervous system, and metabolism of protein and fat</td>
<td>Anemia, nervousness, fatigue, and in some cases, neuritis and brain degeneration</td>
<td>No toxic effects reported</td>
<td>Roast or broil meat and fish.</td>
<td>Vegetarians who do not eat any animal products may need a supplement.</td>
</tr>
<tr>
<td>Biotin</td>
<td>0.3 mg/day</td>
<td>Cereal/grain products, yeast, legumes, liver</td>
<td>Involved in the metabolism of protein, fats, and carbohydrates</td>
<td>Nausea; vomiting; depression; hair loss; dry, scaly skin</td>
<td>No toxic effects reported</td>
<td>Storage, processing, and cooking do not appear to affect this vitamin.</td>
<td>Biotin deficiency is extremely rare in the United States.</td>
</tr>
<tr>
<td>Folate (folacin, folic acid)</td>
<td>0.4 mg/day</td>
<td>Green, leafy vegetables; organ meats; dried peas, beans, and lentils</td>
<td>Aids in genetic material development and involvement in red blood cell production</td>
<td>Gastrointestinal disorders, anemia, cracks on the lips</td>
<td>Some evidence of toxicity in large doses</td>
<td>Store vegetables in refrigerator and steam, boil, or simmer in minimal water.</td>
<td>Deficiencies can occur in premature infants and pregnant women.</td>
</tr>
<tr>
<td>Vitamin</td>
<td>Daily Requirement</td>
<td>Source</td>
<td>Function/Deficiency</td>
<td>Dietary Considerations</td>
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<tr>
<td>Niacin</td>
<td>20 mg/day</td>
<td>Meat, poultry, fish, enriched cereals, peanuts, potatoes, dairy products, eggs</td>
<td>Involved in carbohydrate, protein, and fat metabolism</td>
<td>Skin disorders, diarrhea, indigestion, general fatigue</td>
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<td>Nicotinic acid form should be taken only under physician’s care</td>
<td>Roast or broil beef, veal, lamb, and poultry. Cook potatoes in minimal water.</td>
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<td></td>
<td>Niacin is formed in the body by converting an amino acid found in proteins.</td>
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<tr>
<td>Pantothenic acid</td>
<td>10 mg/day</td>
<td>Lean meats, whole grains, legumes, vegetables, fruits</td>
<td>Helps in the release of energy from fats and carbohydrates</td>
<td>Fatigue, vomiting, stomach stress, infections, muscle cramps</td>
<td>Serve fruits and vegetables raw.</td>
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<td>It is believed some pantothenic acid is produced in the gastrointestinal tract.</td>
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</tr>
<tr>
<td>C (ascorbic acid)</td>
<td>60 mg/day</td>
<td>Citrus fruits, berries, and vegetables, especially peppers</td>
<td>Essential for structure of bones, cartilage, muscle, and blood vessels; also helps maintain capillaries and gums and aids in absorption of iron</td>
<td>Swollen or bleeding gums, slow wound healing, fatigue/depression, poor digestion</td>
<td>Intake of 1 g or more can cause nausea, cramps, and diarrhea</td>
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<td>Do not store or soak fruits and vegetables in water; refrigerate juices and store only 2 to 3 days.</td>
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<td></td>
<td>Smokers may benefit from an increased intake of vitamin C.</td>
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<tr>
<td>D</td>
<td>400 IU/day</td>
<td>Fortified milk, sunlight, fish, eggs, butter, fortified margarine</td>
<td>Aids bone and tooth formation; helps maintain heart action and nervous system</td>
<td>In children: rickets and other bone deformities</td>
<td>High intakes may cause diarrhea and weight loss</td>
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<td></td>
<td></td>
<td>Storage, processing, and cooking do not appear to affect this vitamin.</td>
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<td></td>
<td></td>
<td>Sunlight starts vitamin D production in the skin.</td>
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<tr>
<td>E</td>
<td>30 IU/day</td>
<td>Fortified and multigrain cereals; nuts; wheat germ; vegetable oils; green, leafy vegetables</td>
<td>Protects blood cells, body tissue, and essential fatty acids from harmful destruction in the body</td>
<td>Muscular wasting, nerve damage, anemia, reproductive failure</td>
<td>Relatively nontoxic</td>
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<td></td>
<td>Store in air-tight containers away from light.</td>
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<td>Most fortified cereals have 40% of the RDA.</td>
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<tr>
<td>K</td>
<td>1 mg/kg (infants)</td>
<td>Green, leafy vegetables; fruit; dairy and grain products</td>
<td>Essential for blood clotting functions</td>
<td>Bleeding disorders in newborns and those on blood-thinning medications</td>
<td>Not toxic as found in food</td>
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<td>Store in containers away from light.</td>
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<td></td>
<td></td>
<td>Vitamin K is also formed by bacteria in the colon.</td>
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</tbody>
</table>

IU, International units; mg, milligrams; mcg, micrograms; RDA, recommended dietary allowance.

*For adults and children over 4 years of age.

Many of these symptoms also can be attributed to problems other than vitamin deficiency. If they persist, the patient should see the physician.

No official RDA has been established for vitamin K; however, the recommended amount is 1 mcg/kg of body weight.

Information for this chart was obtained from the U.S. Food and Drug Administration, the American Institute for Cancer Research, and the U.S. Department of Agriculture/Human Nutrition Information Service.
<table>
<thead>
<tr>
<th><strong>TABLE 30-4 Functions of Minerals in the Body</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FUNCTIONS</strong></td>
</tr>
<tr>
<td>Calcium (Ca²⁺)</td>
</tr>
<tr>
<td>Chloride (Cl⁻)</td>
</tr>
<tr>
<td>Magnesium (Mg²⁺)</td>
</tr>
<tr>
<td>Phosphorus (PO₄³⁻)</td>
</tr>
<tr>
<td>Potassium (K⁺)</td>
</tr>
<tr>
<td>Sodium (Na⁺)</td>
</tr>
<tr>
<td>Minerals</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Chromium (Cr&lt;sup&gt;3+&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Copper (Cu&lt;sup&gt;2+&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Fluorine (F&lt;sup&gt;-&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Iodine (I&lt;sup&gt;-&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Iron (Fe&lt;sup&gt;2+&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Manganese (Mn&lt;sup&gt;2+&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Selenium (Se)</td>
</tr>
</tbody>
</table>
TABLE 30-4 Functions of Minerals in the Body—cont'd

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>SOURCES</th>
<th>DEFICIENCY SYMPTOMS</th>
<th>TOXICITY SYMPTOMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc (Zn²⁺)</td>
<td>Whole grains, wheat germ, crabmeat, oyster, liver and other meats, brewer's yeast</td>
<td>Depressed immune function, poor growth, dwarfism, impaired skeletal growth and delayed sexual maturation, acrodynatitis</td>
<td>Severe anemia, nausea, vomiting, abdominal cramps, diarrhea, fever, hypoglycemia (low blood serum copper), malaise, fatigue</td>
</tr>
</tbody>
</table>


- Iron: 18 mg
- Phosphorus: 1,800 mg
- Zinc: 14 mg

Minerals present in the largest amounts include sodium, potassium, calcium, chloride, phosphorus, and magnesium. Those present in very small amounts, the trace elements, include iron, zinc, copper, selenium, chromium, manganese, iodine, and fluorine. The minerals needed only in trace amounts seem either to behave as part of a hormone or enzyme system, or to work with vitamins in various metabolic reactions throughout the body. For example, iodine is part of the thyroid hormone thyroxine, and zinc is part of the hormone insulin. Cobalt is an essential part of vitamin B₁₂.

Calcium, iodine, and iron are the minerals most frequently missing in the American diet. Some of the leading causes of disease-related mineral deficiencies are osteoporosis from lack of vitamin D and/or calcium and iron-deficiency anemia. High sodium levels are associated with hypertension.

Water

Water is all too often overlooked when nutritional status is evaluated. The body is approximately 80% water and can survive longer without food than it can without water. Water is part of almost every vital body process.

Water is lost daily from the body in urine, feces, sweat, and expiration. Extensive water losses from diarrhea, vomiting, burns, or perspiration can lead to electrolyte losses that result in life-threatening imbalances. Water is contained in almost all foods; however, a healthy diet should include about eight glasses of water a day.

THE FOOD GUIDE PYRAMID

In 1992, to reflect the new dietary guidelines that called for more consumption of grains and less consumption of meat, sweets, and fats, the USDA introduced the Food Guide Pyramid. In 2005 the Pyramid was revised (Figure 30-1). For the first time, dietary recommendations recognize the importance of exercise in maintaining a healthy weight; the narrowing of each food group up the pyramid represents the importance of choosing more foods with limited added sugars and fats; the potential exists for multiple guidelines based on age and activity level, which provides an individualized approach to choosing foods that best fit individual characteristics and lifestyles; the width of the food groups represent how much should be consumed from each food group daily, and the emphasis is on the importance of choosing a variety of nutritious foods each day. Students should use the USDA Web site www.mypyramid.gov to take advantage of the many learning opportunities for understanding the new guidelines.

Explaining the food pyramid to patients encourages healthful eating habits. Many patients have never been educated in nutrition and do not know how to plan a healthy diet for themselves or their families. Good nutrition is a balance between carbohydrates, protein, vitamins, minerals, fiber, and water, with limited amounts of fat, sodium, sugar, and alcohol. Calorie intake must be balanced with energy output to maintain a healthy body weight.

FUNCTIONS OF WATER

- Plays a key role in the maintenance of body temperature
- Acts as a solvent and the medium for most biochemical reactions
- Acts as the vehicle for transport of substances such as nutrients, hormones, antibodies, and metabolic waste
- Acts as a lubricant for joints and mucous membranes

HIGHLIGHTS OF THE U.S. DEPARTMENT OF AGRICULTURE'S DIETARY RECOMMENDATIONS

Adequate Nutrients within Caloric Needs
- Consume a variety of nutrient-dense foods while limiting saturated and trans fats, cholesterol, added sugars and salts, and alcohol.
- Meet dietary recommendations by adopting a balanced eating pattern.
- Most Americans need to increase consumption of vitamin E, calcium, potassium, and fiber.
- Childbearing women should increase their intake of iron-rich and folic-acid–containing foods or take supplements.
- Individuals over age 50 should consume B₁₂–fortified foods.
Anatomy of MyPyramid

One size doesn't fit all
USDA's new MyPyramid symbolizes a personalized approach to healthy eating and physical activity. The symbol has been designed to be simple. It has been developed to remind consumers to make healthy food choices and to be active every day. The different parts of the symbol are described below.

Activity
Activity is represented by the steps and the person climbing them, as a reminder of the importance of daily physical activity.

Moderation
Moderation is represented by the narrowing of each food group from bottom to top. The wider base stands for foods with little or no solid fats or added sugars. These should be selected more often. The narrower top area stands for foods containing more added sugars and solid fats. The more active you are, the more of these foods can fit into your diet.

Personalization
Personalization is shown by the person on the steps, the slogan, and the URL. Find the kinds and amounts of food to eat each day at MyPyramid.gov.

Proportionality
Proportionality is shown by the different widths of the food group bands. The widths suggest how much food a person should choose from each group. The widths are just a general guide, not exact proportions. Check the Web site for how much is right for you.

Variety
Variety is symbolized by the 6 color bands representing the 5 food groups of the Pyramid and oils. This illustrates that foods from all groups are needed each day for good health.

Gradual Improvement
Gradual improvement is encouraged by the slogan. It suggests that individuals can benefit from taking small steps to improve their diet and lifestyle each day.

- Aging individuals, those with dark skin, and people who are not exposed to sunlight should eat vitamin D–fortified foods or take a supplement.

**Weight Management**
- Balance the intake of calories with those expended.
- With aging, calories should be decreased and physical activity increased to prevent gradual weight gain over time.
- Those who need to lose weight should do so slowly.
- Reducing the caloric intake by 50 to 100 calories per day prevents weight gain; reducing it by 500 calories a day promotes weight loss.
- Control portion sizes and reduce the intake of saturated fats, added sugars, and alcohol.

**Carbohydrates**
- Choose fiber-rich fruits, vegetables, and whole grains.
- Limit the use of added sugar and sweeteners.
- Practice good dental hygiene and limit sugary snacks to reduce dental caries.

**Sodium and Potassium**
- Consume less than 2,300 mg of sodium per day (approximately 1 teaspoon of salt).
- Consume potassium–rich foods.

**Alcoholic Beverages**
- Use moderate consumption: one drink per day for women and two for men.
- Avoid alcohol if you are or may become pregnant or if lactating.

**Food Safety**
- Clean all fruits, vegetables, and cooking surfaces.
- Keep raw, cooked, and ready to eat foods separate.
- Cook foods to the recommended temperature to kill microbes.
- Chill perishable foods and defrost foods properly.
- Avoid unpasteurized milk products, raw eggs, and raw or undercooked meats.

**Physical Activity**
- Engage in 30 to 60 minutes of moderate physical activity per day to prevent weight gain; 60 to 90 minutes for weight loss.
- Children and adolescents should be physically active 60 minutes a day.
- Aging people should participate in regular exercise to maintain function.
- Include aerobic activity, stretching, and weight training.

**Food Groups to Encourage**
- For a 2,000-calorie diet, consume 2 cups of fruit and 2/3 cups of vegetables a day.
- Eat dark green and orange vegetables, legumes, and starches several times a week.
- At least half of the grains consumed should be whole grains.
- Consume 3 cups of fat-free or low-fat milk or milk products; children age 2 to 8 years should consume 2 cups a day.

**Fats**
- Less than 10% of calories should come from saturated fats and less than 300 mg of cholesterol should be consumed each day; keep trans fats as low as possible.
- Consume less than 35% of calories from fat.
- Choose low-fat or fat-free milk products and lean meats.

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**NUTRITIONAL STATUS ASSESSMENT**

During the physician’s examination of the patient, he or she will assess the patient’s nutritional status. The physician considers the patient’s age; height and weight; body mass index (BMI); overall health status; any recent changes in weight; diet and exercise habits; and lifestyle, culture, and educational background. In addition to this information, the physician may check the patient’s skin turgor to determine the level of hydration and perform various techniques to assess the percentage of body fat.

**Body Fat Measurement**

The location of body fat may be related to an increased risk of developing diabetes, stroke, hypertension, and coronary artery disease. Studies indicate that the body has two places to store fat: at the hips and in the abdomen. Fat at the hips is more common in women and is used to store energy for special purposes, such as during pregnancy and breastfeeding. Abdominal fat, or central obesity, seems to be more dangerous to overall health. Health risks related to weight range from no increased risk with normal weight to severe risk from central obesity, with the risk from other types of obesity falling somewhere in between.

To determine the patient’s status, the waist and hips are measured and correlated with the waist to hip ratio (the bigger the belly, the higher the ratio). Normal ratios are less than 0.75 in women and 0.9 to 0.95 in men. Waist measurements also can predict the risk of developing a weight-related disease. Men at increased risk for disease have a waist measurement greater than 40 inches (102 cm); for women, the risk is increased with a waist measurement greater than 35 inches (88 cm).

At the physician’s request, the medical assistant may perform body fat measurements on a patient. The percentage of body fat may be an indicator of overall health, as well as risk for cardiovascular disease. Body fat can be measured by several methods. A reliable method of measuring body fat uses a specially designed caliper to measure the thickness of a fold of tissue in three areas: the triceps, the subscapular, and the suprailiac regions (Figure 30-2). However, an increasing number of patients have fat folds that are too large for calipers to measure. The physician may also order a dual energy x-ray absorptiometry (DEXA) scan, in which two x-ray beams are used to give accurate feedback on the body fat percentage, where the fat is distributed, and bone density.

**Body Mass Index**

To determine how healthy a patient’s weight level is, the physician may ask the medical assistant to calculate the patient’s BMI. The BMI is the relationship of weight to height that mathemati-
cally correlates the patient's measurements with health risks. It is a more accurate predictor of weight-related diseases than traditional height-weight charts because it provides a good estimate of the degree of body fat.

A patient's BMI can be determined by two methods. The nomogram in Figure 30-3 can be implemented using the patient's weight in kilograms or pounds and height in centimeters or inches. To practice using the nomogram, angle the edge of a piece of paper or a ruler from your weight (on the left) to your height (on the right). Then read the BMI based on your gender where the edge crosses the centerline. The BMI also can be calculated mathematically by dividing the weight in kilograms by the square of the height in meters ($BMI = \text{weight (kg)} \div \text{height (m)}^2$). However, most physician's offices have either a wheel device the medical assistant can use to determine the patient's BMI or a BMI chart (Table 30-5). Most physicians require the medical assistant to record the patient's BMI after the height and weight have been measured, because decisions on the patient's health status are based on the BMI. Table 30-6 correlates the BMI with risks for disease.

Individuals with a BMI of 19 to 22 are thought to live the longest. Death rates are significantly higher for people with a BMI of 25 or above. If the risk is anything other than acceptable, dietary modifications may be needed. The physician must make this decision when all the information on the patient has been evaluated.

CRITICAL THINKING APPLICATION 30-3
The physician encourages Mr. Hawthorne to lose weight to lower his BMI of 29. Explain how Marcia should teach Mr. Hawthorne about the importance of his BMI, how it is measured, and how he can calculate this value at home.

THERAPEUTIC NUTRITION
Although most patients are treated medically, without a therapeutic diet, some illnesses and diseases can be cured and some
and gelatin. In some cases, apple juice and cranberry juice may be allowed. A full liquid diet includes all foods allowed on a clear liquid diet plus milk, custards, strained cream soups, refined cereals, eggnog, milkshakes, and all juices. This diet may be indicated as part of preparation for certain diagnostic tests (e.g., colonoscopy) or for the first several days after major surgery.

**Soft or Light Diet**
When a soft or light diet is prescribed, foods with roughage are eliminated (no raw fruits or vegetables). No strongly flavored or gas-forming vegetables are allowed (e.g., onions, beans, broccoli, and cauliflower), and spices also may be limited. This diet often is used after surgery to place less strain on the gastrointestinal system or for patients with certain gastrointestinal disorders.

**Mechanical Soft Diet**
A mechanical soft diet is a regular diet in which the food is chopped, ground, or pureed, depending on the degree of texture change required. No foods or spices are restricted. This diet may be used after dental or oral surgery or for patients who have difficulty chewing or swallowing.

**Bland Diet**
A bland diet restricts dietary components classified as gastrointestinal irritants. Such a diet limits any foods that are chemically irritating (e.g., caffeine, pepper, chili, nutmeg, and alcohol) or mechanically irritating (e.g., high-fiber foods). No fried foods or highly concentrated sweets are allowed. Gas-forming vegetables belonging to the onion and cabbage family also are eliminated. A bland diet is commonly used for problems of the gastrointestinal tract. Such a diet should supply sufficient nutrients for the individual to meet the recommended daily allowances, unless fruits and vegetables are eliminated.

**Elimination Diet**
Diets that modify the levels of specific foods most frequently are used to treat allergies of various kinds. Two basic elimination regimens are used. A simple elimination diet removes only one or two foods that are suspected of causing the allergy. The Rowe elimination diet involves a more extensive program. With this method, the basic diet consists of a few hypoallergenic foods, such as rice cereal, apples, pears, carrots, sweet potatoes, lamb, and milk substitutes. If no allergic reaction is observed, single food-family groups are added slowly over about 10 days while the child is observed for the onset of allergic symptoms. The most common food allergens seen in children are chocolate, wheat, eggs, and milk. With some children, meeting the recommended daily allowances for all nutrients may be difficult; in such cases, supplements should be ordered.

**High- or Low-Fiber Diet**
The amount of bulk or fiber in the diet is either increased or decreased, depending on the specific disorder of the colon or large bowel. In either case, foods high in cellulose are considered to be high in fiber, because the body does not digest this carbohydrate well, and a residue is left in the colon. In some instances,
**TABLE 30-5 Body Mass Index Chart**

<table>
<thead>
<tr>
<th>HEIGHT (in)</th>
<th>19</th>
<th>20</th>
<th>21</th>
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</tbody>
</table>


*To use the table, find the appropriate height in the left-hand column. Move across to a given weight. The number at the top of the column is the BMI at that height and weight. Pounds have been rounded off.*

**TABLE 30-6 Body Mass Index and Disease Risk**

<table>
<thead>
<tr>
<th>BODY MASS INDEX</th>
<th>CLASSIFICATION</th>
<th>DISEASE RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.5 or less</td>
<td>Underweight</td>
<td>Low</td>
</tr>
<tr>
<td>18.5-24.9</td>
<td>Normal weight</td>
<td>Low</td>
</tr>
<tr>
<td>25-29.9</td>
<td>Overweight</td>
<td>Increased</td>
</tr>
<tr>
<td>30-34.9</td>
<td>Obese</td>
<td>High</td>
</tr>
<tr>
<td>35-39.9</td>
<td>Obese</td>
<td>Very high</td>
</tr>
<tr>
<td>40 or greater</td>
<td>Extremely obese</td>
<td>Extremely high</td>
</tr>
</tbody>
</table>

A low-residue diet is distinguished from a low-fiber diet. In this case, a low-fiber diet eliminates foods with a high cellulose content, and a low-residue diet restricts milk in addition to fiber content. Either diet should supply all the nutrients needed; however, if milk is restricted drastically, the calcium level must be watched carefully. Low-fiber diets are prescribed for patients with certain gastrointestinal disorders such as diverticulitis. High-fiber diets are recommended for patients with hypercholesterolemia or diabetes mellitus and to prevent certain forms of cancer.

**Diabetic Diet**

The specific diet for a patient with diabetes is determined by the individual's health needs. The basic goal of managing the disease is to maintain consistent control of the blood glucose level. When developing a diabetic diet plan, the physician or dietitian must consider additional factors, such as the need for weight control, individual patient preferences, exercise patterns, and lifestyle factors. General guidelines for a healthy diabetic diet include the following:

- Five servings of dark-colored fruits and vegetables and six of whole grains each day
- Two weekly servings of fatty fish (salmon, cod, mackerel)
- Complex carbohydrates that are high in fiber (e.g., whole grains)
- Monounsaturated fats (olive and canola oil)
- Daily serving of nuts, seeds, or legumes
- Fish or soy over poultry or other meat
- Avoidance of fat diets, especially those with high-protein, low-carbohydrate foods
- Reduced salt intake
- Avoidance of saturated fats (animal fat) and trans fats

Traditionally, the diabetic diet has been based on exchange lists, which groups foods according to similar calorie,
<table>
<thead>
<tr>
<th>EXCHANGE GROUPS AND SERVING SIZES</th>
<th>1,200*</th>
<th>1,500*</th>
<th>1,800*</th>
<th>2,000*</th>
<th>2,200*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch or bread: One exchange equals 1 oz bread and ½ cup cooked cereal, grain, or pasta</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>13</td>
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<tr>
<td>Meat and cheese: One exchange equals 1 oz; high-fat exchanges should be used no more than three times per week</td>
<td>4</td>
<td>5</td>
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<tr>
<td>Vegetables: One exchange equals ½ cup cooked, 1 cup raw, and ½ cup juice</td>
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<td>3</td>
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<tr>
<td>Fruits and sugar: No more than 10% of total daily carbohydrates; each exchange equals 15 g carbohydrate</td>
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<tr>
<td>Milk products: One exchange equals 1 cup (8 oz); skim and very-low-fat milk products are recommended</td>
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<tr>
<td>Fats: One exchange equals 1 teaspoon of fat</td>
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</table>

*Number of calories in the prescribed diabetic diet.

Carbohydrate, protein, and fat content. The objective of exchange lists is to achieve the proper balance of carbohydrates, proteins, and fats while maintaining healthy weight and blood glucose levels. Menus are developed based on food groupings and the optimum number of daily calories needed to meet the patient's needs. Foods can be substituted for another within an exchange list but not among lists. A copy of the exchange list can be obtained from the American Diabetes Association. Table 30-7 lists the number of exchanges per day allowed within certain calorie-restricted diabetic diets.

Diabetes educators agree, however, that the simplest way to teach patients about the relationship between diet and blood glucose levels is to focus on the total number of carbohydrates patients can consume daily while maintaining their recommended blood glucose level. Patients then can decide how they want to distribute carbohydrate intake throughout the day. The number of grams of carbohydrate a patient with diabetes can eat each day is determined by a combination of the following factors: the patient's weight and whether weight loss or maintenance is part of the treatment plan; the level of exercise, because physical activity lowers the blood glucose level; prescribed diabetic medications, including insulin; and other factors, such as age and blood lipid levels.

Therefore, people with diabetes can eat sugary foods as long as they restrict themselves to the total number of carbohydrates allowed for that snack or meal and the diet to eat that food adheres to the rules of healthy nutrition. In other words, a patient with diabetes can have a whole-wheat raisin bagel for breakfast as long as the total carbohydrate grams for that food do not exceed the number of carbohydrates that should be eaten for that particular meal. Table 30-8 presents breakfast choices for a patient with diabetes restricted to a total of 50 g of carbohydrate.

All carbohydrates raise the blood glucose level to a similar degree. In general, 1 g of carbohydrate raises the blood sugar level of a person who weighs 150 pounds by 4 points; for a person who weighs 200 pounds, it raises the level by 3 points. However, not all carbohydrates raise the blood glucose level at the same rate. Choosing a carbohydrate that takes longer to affect the blood glucose level helps control hyperglycemic peaks, which are associated with the complications of diabetes mellitus. A rating system known as the Glycemic Index may help solve this problem. The Glycemic Index rates carbohydrate foods on a scale from slowest to fastest effects on blood glucose levels. The lower the Glycemic Index value of the food, the longer it takes to raise the patient's blood glucose level. One of the scales is based on 100 glycemic units, which is equivalent to the number of units in a glucose tablet. The Glycemic Index of foods helps diabetics understand the impact of different carbohydrates on the blood glucose level, but it can be a complicated tool to understand, and it must be used in conjunction with a dietary plan that considers the nutritional guidelines for all foods.

**GLYCEMIC INDEX (GI) VALUES OF SOME FOODS**

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<th>Food</th>
<th>GI Value</th>
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<th>GI Value</th>
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<td>Puffed rice</td>
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<td>Potato chips</td>
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<td>Oatmeal</td>
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</tr>
<tr>
<td>Whole-wheat bread</td>
<td>72</td>
<td>Yogurt</td>
<td>38</td>
</tr>
<tr>
<td>Shredded wheat</td>
<td>70</td>
<td>Milk</td>
<td>34</td>
</tr>
<tr>
<td>Brown rice</td>
<td>66</td>
<td>Kidney beans</td>
<td>33</td>
</tr>
<tr>
<td>Refined sugar</td>
<td>64</td>
<td>Fructose</td>
<td>22</td>
</tr>
<tr>
<td>Rye bread</td>
<td>64</td>
<td>Soybeans</td>
<td>14</td>
</tr>
</tbody>
</table>

*Based on a 0 to 100 scale.*
**TABLE 30-8** Grams of Carbohydrate in Breakfast Foods

<table>
<thead>
<tr>
<th>FOOD TYPE</th>
<th>SERVING SIZE</th>
<th>CARBOHYDRATE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1% Reduced fat milk</td>
<td>1 cup</td>
<td>12</td>
</tr>
<tr>
<td>Bran Chex</td>
<td>¾ cup</td>
<td>23</td>
</tr>
<tr>
<td>Frosted Flakes</td>
<td>¾ cup</td>
<td>26</td>
</tr>
<tr>
<td>Apples and cinnamon instant oatmeal</td>
<td>1 packet</td>
<td>27</td>
</tr>
<tr>
<td>Low-fat granola</td>
<td>½ cup</td>
<td>30</td>
</tr>
<tr>
<td>Toast</td>
<td>1 slice</td>
<td>15</td>
</tr>
<tr>
<td>White table sugar</td>
<td>1 teaspoon</td>
<td>4</td>
</tr>
<tr>
<td>Pancakes</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Pancake syrup</td>
<td>2 tablespoons</td>
<td>30</td>
</tr>
<tr>
<td>Light pancake syrup</td>
<td>2 tablespoons</td>
<td>4</td>
</tr>
<tr>
<td>Fruit yogurt</td>
<td>1 cup</td>
<td>40</td>
</tr>
<tr>
<td>Fruit yogurt with NutraSweet</td>
<td>1 cup</td>
<td>19</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>½ cup</td>
<td>15</td>
</tr>
<tr>
<td>Banana</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>


**CRITICAL THINKING APPLICATION 30-4**

Samantha Rashad recently was diagnosed with diabetes mellitus type 2. She has met with the dietitian, but she has some questions about her 1,200-calorie diabetic diet. The goals of her dietary management are to maintain blood glucose levels within normal range while encouraging weight loss. Based on Marsha’s knowledge of the components of a healthy diet, what recommendations can she make to Ms. Rashad?

**Heart-Healthy Diet**

The goals for a heart-healthy diet are to encourage the patient to eat foods that reduce the overall cholesterol levels and LDL, increase the HDL, and keep blood pressure within normal limits. Other factors that must be considered for patients at risk for heart disease are obesity and the patient’s typical exercise patterns. Obesity is associated with elevated lipid levels; therefore, weight management must be part of the patient’s dietary plan. In addition, researchers report that an aerobic exercise program must be included to maintain cholesterol at a healthy level.

**AMERICAN HEART ASSOCIATION EATING PLAN FOR HEALTHY AMERICANS**

- Eat five or more servings a day of a variety of fruits and vegetables.
- Eat six or more servings a day of a variety of grain products, including whole grains.
- Eat fish at least twice a week, particularly fatty fish (e.g., salmon).
- Include fat-free and low-fat milk products, legumes, skinless poultry, and lean meats.

**CROSS-CULTURAL TIPS FOR REDUCING SODIUM AND FAT**

- Limit the use of soy or teriyaki sauce, even the low-sodium type.
- Eat fresh or frozen fruits and vegetables; choose canned products low in sodium or rinse them before eating.
- Bake or broil meats rather than frying; limit beef products; remove skin from chicken before cooking; increase the intake of unprocessed fish.
- Cook with olive or canola oil.
- Limit servings of cured foods, such as ham and bacon; avoid pickles and other foods prepared in brine; limit condiments such as mustard and ketchup.
- Cook rice and pasta without added salt; do not use instant versions, which are higher in sodium.
- Do not add salt to food; use substitute spices, such as lemon, lime, and herbs.

**CRITICAL THINKING APPLICATION 30-5**

Ms. Rashad’s blood pressure at this visit was 182/94. She is concerned about the risks of heart disease and wants to lower her blood pressure. What facts about a heart-healthy diet should Marsha share with her to help her understand the importance of nutrition in overall wellness?

**READING FOOD LABELS**

The USDA requires that all food products carry a nutritional facts label (Figure 30-4). These labels are a source of information about the nutrients in the product. When a designated diet is planned or implemented, the food label can be used as a valuable source of nutritional information (Procedure 30-1).

In the label’s Nutrition Facts panel, manufacturers are required to provide information about certain nutrients. In the list below, the mandatory components of a food label are italicized, and the voluntary components are presented in the order in which they must appear:
**Nutrition Facts**

Serving Size 1/12 package (44g, about 1/4 cup dry mix)

Serving Per Container 12

<table>
<thead>
<tr>
<th></th>
<th>Amount Per Serving</th>
<th>% Daily Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>150</td>
<td>3%</td>
</tr>
<tr>
<td>Calories from Fat</td>
<td>45</td>
<td>7%</td>
</tr>
<tr>
<td>Total Fat</td>
<td>5g</td>
<td>8%</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>2g</td>
<td>10%</td>
</tr>
<tr>
<td>Trans Fat</td>
<td>1g</td>
<td>2%</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>0g</td>
<td>0%</td>
</tr>
<tr>
<td>Sodium</td>
<td>300mg</td>
<td>13%</td>
</tr>
<tr>
<td>Total Carbohydrate</td>
<td>34g</td>
<td>11%</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>6g</td>
<td>2%</td>
</tr>
<tr>
<td>Sugars</td>
<td>18g</td>
<td>4%</td>
</tr>
</tbody>
</table>

### Vitamins and Minerals

- Vitamin A: 0% Daily Value
- Vitamin C: 0% Daily Value
- Calcium: 0% Daily Value
- Iron: 2% Daily Value

<table>
<thead>
<tr>
<th></th>
<th>Amount Per Serving</th>
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</thead>
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<tr>
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<tr>
<td>Sugars</td>
<td>18g</td>
<td>4%</td>
</tr>
</tbody>
</table>

**FIGURE 30-4** Nutritional facts label. (From U. S. Food and Drug Administration: Accessed January 26, 2010, at www.cfsan.fda.gov/)

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**PROCEDURE 30-1**

**Teach the Patient to Read Food Labels**

**GOAL:** To explain to the patient the nutritional labeling of food products.

**EQUIPMENT and SUPPLIES**

- One each of three bars: Snickers candy bar, granola bar, fat-free fruit bar
- Pencil and paper
- The patient record

**PROCEDURAL STEPS**

1. Using the patient health and family histories, assess the patient to determine cultural influences that may affect dietary choices.
   **PURPOSE:** Cultural factors may influence the patient’s dietary choices.

2. Introduce yourself and explain to the patient that you are going to teach him or her how to read a food label. Be sure to include reasons why food labels are a valuable source of nutritional information in diet planning.
   **PURPOSE:** Explaining the rationale for consistently reading food labels encourages the patient to participate in the education process.

3. Using the labels on each bar, point out the nutritional information according to the guidelines in the text.
   **PURPOSE:** Using actual labels assists learning and reinforces practical applications.

4. Give the patient the pencil and paper to write down the serving size of each type of bar.
   **PURPOSE:** Writing down information aids memory retention.

5. Compare the similarities and differences among the bars.
   **PURPOSE:** Comparing the results reinforces learning.

6. Have the patient write down the total amount of calories for each product serving.
   **PURPOSE:** To reinforce the significant effect of high-calorie snacks on overall nutritional health.

7. Write down the percentage of total, saturated, trans, and unsaturated fats.
   **PURPOSE:** To review the importance of a low-fat diet and the role of saturated and trans fats in disease.

8. Compare the similarities and differences among the bars.

9. Together, analyze the nutritional level of each.

10. Discuss any new information learned.
    **PURPOSE:** To gather feedback about the learning experience so that the patient’s learning needs are clarified.

11. Ask the patient whether he or she will use this information when shopping and how it will be implemented in nutritional planning.
    **PURPOSE:** Role-play implementation of information to determine the level of learning.

12. Document the education intervention, including the feedback received from the patient about his or her understanding of how to read food labels.
    **PURPOSE:** Documentation in the medical record provides proof of patient education and an assessment of the patient’s ability to apply the knowledge to daily practice.
and voluntary components are the only ones allowed in the Nutrition Facts panel. The required nutrients were selected because they address today's health concerns. The order in which they must appear reflects the priority of current dietary recommendations.

### How to Use Label Information

When evaluating the nutritional value of a food product, begin with the serving size information, which is listed in both household and metric units. The amount of each nutrient in the food is expressed in two ways: in terms of weight per serving and as a percentage of the daily value. By using the percentage of daily value, you can determine whether a food contributes a lot or a little of a particular nutrient. However, if you eat more or less than the serving size on the label, you will need to adjust the amounts of nutrients and number of calories accordingly. Keep in mind that the percentage of daily value is based on the amount of food usually eaten in 1 day. The goal is to choose foods that total 100% of your daily nutrition needs.

The ingredient list also can help you learn more about the foods you eat. Ingredients are listed in descending order of weight. That helps you get an idea of the proportion of an ingredient in a food (Figure 30-5). Artificial colors have to be named in the ingredient list; they no longer can be stated as “color added.” This is an important item for individuals with food allergies or certain specialized diets. In addition, the total percentage of juice in a juice drink must be declared so that you can see exactly how much juice is in the product.

The front-package label is where manufacturers often place statements describing the nutritional qualities of their product. The government has set strict conditions under which statements such as “low fat,” “cholesterol free,” and “good source of fiber” can be used as part of the front label. The Food and Drug Administration (FDA) permits claims linking a nutrient or food to the risk of a disease or health-related condition, but only claims supported by scientific evidence are allowed.

### Regulated Nutritional Claims for Food Labels

- **Light:** One-third fewer calories than in the regular product
- **Fresh:** Raw; never frozen, processed, or preserved
- **Calorie-free:** Less than 5 calories per serving
- **Sugar-free:** Less than 0.5 g of sugar per serving
- **Sodium-free:** Less than 5 mg of sodium per serving
- **Fat-free:** Less than 0.5 g of fat per serving
- **Saturated fat-free:** Less than 2 g of saturated fat per serving
- **High:** Provides more than 20% of the recommended daily consumption of the nutrient (e.g., high-fiber)
- **Lean:** Cooked meat or poultry with less than 10.5 g of fat, of which less than 3.5 g is saturated fat
- **Extra lean:** Cooked meat or poultry with less than 4.9 g of fat, of which less than 1.8 g is saturated fat
- **Low-sodium:** Less than 140 mg of sodium
- **Low-calorie:** Less than 40 calories
- **Low-fat:** 3 g or less of fat

### Organic Foods Production Act

In 1990 the USDA initiated regulations for organically grown food, and in 2002 the agency revised the regulations governing the production and labeling of organic foods. Until then, organizations from state governments to trade and consumer groups contributed to the regulation of organic products, resulting in often conflicting standards about which products could be labeled organic. Under the new guidelines, foods labeled organic must have been produced without exposure to pesticides, chemical fertilizers, or sewage sludge. The food cannot have been irradiated to extend shelf life, nor can it contain any genetically modified ingredients. In addition, animals raised for organic meat, eggs, and milk cannot be given antibiotics or growth hormones, must be fed organic feed, and must have had access to the outdoors.

The 2002 regulations extended the rules to cover labeling for organic foods. Products with a “100 percent organic” label are limited to strictly organic ingredients. Products simply labeled “organic” identify the food as being made up of 95% organic materials. Products that fall into these two categories can display a “USDA Organic” seal. Foods containing at least 70% organic ingredients may be labeled “made with organic ingredients” and may list up to three of them on the package. Under the new regulations, any product containing less than 70% organic ingredients may not be marketed as an organic food.

### Food-Borne Diseases

Eating or drinking contaminated food can result in a food-borne disease. Many different types of bacteria, viruses, and parasites can contaminate food, but the most common are *Escherichia coli* and *Salmonella* and *Campylobacter* organisms. Patients may experience a variety of symptoms, but the first typically are...
gastrointestinal: nausea, vomiting, stomach pain, and/or diarrhea. Usually a delay of several hours to days occurs after ingestion of the contaminated substance before symptoms begin. This is the incubation period, when the microbes are attaching to the intestinal wall and beginning to multiply. The diagnosis is confirmed with laboratory tests, of which the most common is a stool sample. However, more sophisticated tests may be needed to diagnose viral pathogens. Treatment depends on the patient’s symptoms; if diarrhea and vomiting are severe, one of the biggest concerns is dehydration, especially in young children and older adults. In such cases, replacing fluid and electrolytes is the most important aspect of care. Other treatments include the use of antidiarrheal medications (e.g., Imodium) and drugs that coat the gastrointestinal tract (e.g., Pepto-Bismol).

When medical assistants are screening phone calls from patients experiencing gastrointestinal symptoms, some important factors are:

- Fever of 38.6°C (101.5° F) or higher
- Diarrhea lasting longer than 3 days
- Prolonged vomiting
- Blood in the stool
- Signs of dehydration (reduced urination, dry mouth, vertigo, and altered skin turgor)

For a list of food safety guidelines, visit the Evolve site at evolve.elsevier.com/kimm.

**FOOD CONTAMINANTS**

Environmental contamination of food can be a serious problem. The FDA regularly monitors the presence of contaminants in the food chain and issues warnings as needed to protect consumers from possible danger. Mercury is the most common heavy metal found in food, primarily fish. Other environmental contaminants include cadmium from industrial processing; lead found in old paint and old plumbing; and polychlorinated biphenyls (PCBs), which are part of discarded electrical equipment. Each of these can have serious toxic effects on humans. For example, mercury at toxic levels can poison the nervous system, especially that of a developing fetus. The FDA therefore recommends that pregnant women, women of childbearing age, nursing mothers, and young children not eat any fish known to have high mercury levels. These include king mackerel, swordfish, shark, and any fresh water fish from lakes or rivers known to be contaminated with mercury.

**EATING DISORDERS**

An eating disorder is any eating behavior pattern that can lead to a health problem. The two problems that cause the most serious health risks are anorexia nervosa and bulimia. These disorders can damage all the body systems and can cause death. Although 90% of reported cases occur in adolescent and young adult women, the incidence in males and middle-aged women is rising.

Anorexia nervosa is characterized by self-induced starvation. Anorexic individuals typically are adolescents when first diagnosed and tend to be perfectionists who are extremely sensitive to failure and any criticism. They use avoidance of food as a way of controlling their feelings and fear of becoming grossly overweight if they allow themselves to eat. As a result, they lose an excessive amount of weight, usually 15% to 60% of their normal body weight, resulting in extreme malnourishment. They can die without medical intervention. If necessary, patients are fed intravenously or by nasogastric tube feedings to establish an immediate level of nourishment to the body systems. Patients with anorexia nervosa have a significantly distorted body image and require psychotherapy to alleviate depression, to deal with their emotional issues, and for assistance in forming a positive self-image.

Bulimia is more common than anorexia and is characterized by cycles of bingeing and purging. This behavior pattern usually begins in adolescence when a person is slightly overweight, but fails to achieve the expected results. Psychologically the person believes that self-worth is related to being thin. Usually the pattern begins with some form of stress that upsets the individual, who then turns to food for consolation. Intake during a binge period can reach as high as 20,000 calories. The eating binge is followed by self-induced punishment in the form of vomiting, using laxatives and enemas, excessive exercise, and food abstinence. Most individuals with bulimia have a normal or an above-normal body weight, but their weight can vary as much as 10 pounds during binging and purging cycles. Treatment programs are a combination of medication, psychotherapy, and nutritional counseling. The goal is to help the patient establish healthy eating patterns and develop an improved self-image.

**CRITICAL THINKING APPLICATION 30-6**

A close friend of Marcia’s sister is visiting, and Marcia hears the friend tell her sister that she is using Ex-Lax after every meal and secretly exercising for 3 hours at night after the rest of the family is asleep. The young woman is 5 feet, 6 inches tall and determined not to weigh more than 100 pounds at graduation. What should Marcia do?

**OBESITY**

Overweight and obesity affect more than 60% of the American population. Obese individuals are at risk for a wide range of health problems, including hypertension, diabetes mellitus type 2, coronary artery disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, and certain types of cancer. The physician’s assessment of patients with weight problems includes an evaluation of the BMI and/or the patient’s waist to hip ratio, as well as the presence of risks of conditions associated with obesity. As the BMI rises, so do the risks for cardiovascular disease, hypertension, and hypercholesterolemia, and death.

Gastrointestinal surgery, or bariatric surgery, may be an option for people who are severely obese, have attempted unsuccessfully to lose weight by traditional means, and have been diagnosed with obesity-related health problems. The operation promotes weight loss by reducing the size of the stomach to the point that food intake is restricted and/or interrupting the digestive process by surgically circumventing part of the small intestine. Three different types of surgical procedures can be performed: restrictive surgery, which reduces the size of the stomach and slows the
movement of food through it; malabsorptive surgery, which bypasses most of the small intestine, affecting nutrient digestion and absorption; and combined restrictive-malabsorptive surgery, which uses both techniques to reduce the amount of food ingested and the digestion and absorption of nutrients.

Patients seeking bariatric surgery must meet certain criteria, including a BMI of 40 or greater, or a BMI of 35 to 39.9 along with a diagnosed obesity-related health problem, such as diabetes mellitus type 2 or severe sleep apnea. The patient also must undergo counseling and psychiatric evaluation, because bariatric surgery requires a lifelong commitment to dietary change. The procedure is successful for long-term weight loss only if the individual is willing to commit to making drastic behavioral changes and undergoing regular medical checkups for the rest of his or her life. In addition, the cost of the procedure ($20,000 to $35,000) may be prohibitive, and insurance coverage varies by state and insurance provider.

According to the Harvard School of Public Health, 100,000 cases of cancer a year can be directly linked to obesity, according to the following distributions:

- Breast: 11%
- Colon: 14%
- Esophageal: 39%
- Kidney: 31%
- Non-Hodgkin's lymphoma: 20%
- Pancreatic: 14%

### Medications for Obesity

Weight-loss medications fall into two categories: appetite suppressants and lipase inhibitors. Appetite-suppressant medications, such as phentermine (Adipex-P, Fastin, Ionamin, Oby-Trim, Pro-Fast, Zantrel) and sibutramine (Meridia), promote weight loss by reducing the appetite or increasing the feeling of being full. Orlistat (Xenical), a lipase inhibitor, blocks the release of the enzyme lipase, which metabolizes fat for absorption. If fat is not broken down, it cannot be absorbed, which results in a decrease in dietary fat absorption by about one third. Most weight-loss medications have been approved by the FDA for short-term use only, typically restricted to a few weeks. Meridia and Xenical are the only weight-loss medications that have been approved for use longer than 2 years. The response to medications for weight loss varies among patients, but the average weight loss is 5 to 22 pounds more than might have been lost without medication. Most of the weight is lost in the first 6 months of treatment, after which the patient’s weight stabilizes or may even increase. The use of weight-loss medications must be combined with improvement in overall nutrition and exercise to have long-lasting effects and reduce weight-related health risks.

### Health Promotion

The concept of health promotion includes such aspects as adequate nutrition, a healthy environment, ongoing health education, and an overall attempt to prevent disease and maintain optimum wellness. Wellness goes beyond the absence of disease to a state of moving toward fitness, managing stress, and maximizing individual potential. Health promotion employs immunizations, appropriate personal hygiene, environmental sanitation standards, protection against occupational hazards, nutritious diets, and periodic health screenings and examinations to diagnose health problems early and promote wellness.

The medical assistant plays a key role in assisting the physician in many of these areas. In addition, the medical assistant can serve as a patient advocate by interacting with local social service agencies or insurance companies on the patient’s behalf. The medical assistant also plays an important role in scheduling and in assisting the physician with health screenings and physical examinations, as well as assisting with health teaching. Components of wellness that all medical assistants should promote include exercise, stress management, and health screening.

### Exercise

Exercise is defined as physical exertion for the maintenance or improvement of health or for the correction of a physical handicap. Exercise improves cardiorespiratory endurance; maintains musculoskeletal health by improving or maintaining strength, flexibility, and bone integrity; and relieves stress. Although most Americans say they know about the benefits of exercise, only 20% to 25% of adults exercise enough to gain significant health benefits. Twenty-five percent are not active at all, and more than half of all American youths 12 to 21 years of age are not vigorously active on a regular basis.

A well-balanced diet is only half of the fitness equation; to ensure good health, adequate exercise and sufficient rest form the other half of the equation. As with special diets, exercise programs must be approved for each individual by the physician. It is the physician who determines the patient’s exercise needs and tolerance levels to safeguard the patient from overexertion and potential injury.

Many forms of exercise are available. Some patients may find that it is best to go to a gym and develop a formal program of physical fitness. Others may purchase home exercise equipment so they can exercise in privacy. Many feel just getting out in the fresh air and walking is the best form of exercise. Each individual should find the outlet that brings enjoyment and enrichment to his or her life. It is not the form of exercise that is important, but the participation in physical activity that promotes wellness.

If you are working with a patient who cannot engage in a full physical exercise program, you can suggest range-of-motion exercises. These exercise patterns are designed to improve circulation and promote muscle tone by putting each joint through its full range of motion. Patients with disabilities such as partial paralysis, arthritis, bursitis, and musculoskeletal deformities may be helped by these exercises. Range-of-motion exercises are presented in Chapter 43.

### Critical Thinking Application 30-7

The physician tells Mr. Hawthorne that he must exercise to maintain a healthy lifestyle. What can Marcia tell him about the benefits of exercise and possible methods that might help him follow through with the physician’s recommendation?
**Stress Management**

Stress stimulates the fight-or-flight response that physically prepares us to either fight or run away from it. Unfortunately, most of the stress we experience on a daily basis is not something we can either physically battle or effectively run away from. Therefore the stress response can lead to multiple health problems if it is not managed therapeutically. The stress response results in the release of epinephrine (adrenaline), which increases the heart and respiratory rates, slows peristalsis, increases blood supply to the skeletal muscles while reducing blood to the periphery, causes overall muscular tension, and raises the blood pressure. If stress is permitted to build without release, multiple health problems can occur, some of which can lead to chronic disorders. One of the best methods for reducing stress is exercise.

**Health Screening**

Routine physical examinations and health screenings are important components of health promotion. The patient scheduled for a physical examination should have a health history completed or updated and should be weighed; blood pressure, temperature, pulse, and respirations recorded; and any complaints documented on the chart. The physician may order the following studies as part of a health screening process:

- Tuberculin skin test
- Papanicolaou (Pap) smear
- Prostate-specific antigen (PSA) levels
- Hemocult test after age 50
- Colonoscopy or sigmoidoscopy every 3 to 5 years after age 50
- Mammogram yearly after age 40
- Urinalysis
- Serum cholesterol
- Chest x-ray films
- Electrocardiogram (ECG)

**Closing Comments**

**Patient Education**

Because medical assistants may be asked to discuss a diet plan with a patient, it is extremely important that they have a thorough knowledge of diet therapy. The patient must understand the prescribed diet and the rationale for using it. If the patient feels uneasy or if his or her questions go unanswered, the person may be less motivated to follow a diet plan. You can be a valuable asset to the physician, the dietitian, and the patient in the implementation of a specific diet.

When talking to patients about a diet, the medical assistant may find the following helpful:

- Use charts and diagrams to illustrate diets.
- Consider the patient’s dietary likes and dislikes.
- Remember that ethnic and cultural foods are important.
- Encourage the patient to play an active role in the learning process.
- Suggest local support groups that can help in diet maintenance.

You also can play a vital role in health promotion by making sure patients are scheduled for annual examinations and that they follow up with the physician’s recommendations for dietary changes, exercise programs, stress management approaches, and health screening procedures. The medical assistant is the link between the patient and the physician, as well as between the patient and available community resources.

**Legal and Ethical Issues**

Always remember that you are not a physician, nor are you a dietitian; follow the physician’s instructions. If you are not sure of the answer to a question, always ask the physician. If your workplace employs a registered dietitian, refer questions about meal patterns and food selection changes to that individual. Direct patients seeking advice in the field of nutrition and exercise programs to someone who is a qualified expert. Use community resources as needed.

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**SUMMARY OF SCENARIO**

As a certified medical assistant working in an internal medicine practice, Marcia must be familiar with the types and functions of dietary nutrients, the Food Guide Pyramid, how nutritional assessments are conducted, the concepts of therapeutic nutrition, how to apply the interpretation of food labels to patient practice, and the concepts of health promotion. Recommendations for nutrition are constantly changing as research is done on the dietary needs of healthy people. Marcia can refer her patients to the USDA Web site (www.mypyramid.gov) for updated information on the Food Guide Pyramid and for educational material on nutrition.

Physicians now rely on the BAI to determine a patient’s risk for diet-related diseases, and medical assistants in a physician’s office must be familiar with various therapeutic diets so that they can answer patients’ questions about foods that should be included or avoided.

As a certified medical assistant, Marcia must make a commitment to lifelong learning so that she can provide her patients with up-to-date information on nutrition-related topics and can use community resources to support patient care.
1. Define, spell, and pronounce the terms listed in the vocabulary. Spelling and pronouncing medical terms correctly bolster the medical assistant’s credibility. Knowing the definitions of these terms promotes confidence in communication with patients and co-workers.

2. Apply critical thinking skills in performing the patient assessment and patient care. Completing the Critical Thinking Application exercises throughout the chapter can help the student medical assistant become more adept at critical analysis of real-life situations.

3. Recognize the impact of cultural influences on dietary choices. People eat the way they do for many reasons. Encouraging patients to make significant lifestyle changes with regard to their diets requires sensitivity to these reasons. The choices people make about what they eat are greatly influenced by their background and relationships. Every culture, religion, and ethnic group has its own beliefs and practices with regard to food.

4. Analyze the relationship between poor diet and lifestyle choices and the risk of developing diet-related diseases. Research has found that lifestyle and dietary habits directly correlate with the development of certain diseases and disorders. These include certain types of anemia, constipation, diabetes mellitus type 2, hypercholesterolemia, atherosclerosis, hypertension, osteoporosis, and cerebrovascular accidents.

5. Classify the types and functions of dietary nutrients. Nutrients consist of carbohydrates, fats, proteins, vitamins, minerals, and water. Their primary functions are to provide the body with energy, protection, and insulation; build and repair tissues; and regulate metabolic processes.

6. Describe the role of carbohydrates, fats, and protein in the daily diet. The primary function of carbohydrates is to provide the body with a ready source of energy. Dietary fiber plays an important role in maintaining regularity and helping to prevent cancer and heart disease. Dietary fat provides essential fatty acids and is needed for the absorption of fat-soluble vitamins. Adipose tissue helps protect the organs of the body, insulates, and serves as a concentrated form of stored energy. Protein builds and repairs tissue and assists with metabolic processes.

7. Explain the function of appropriate amounts of vitamins, minerals, and water in the diet. Vitamins are essential for metabolic functions and are classified as either fat or water-soluble. They regulate the synthesis of body tissues and aid the metabolism of nutrients. Vitamins also play a vital role in disease prevention. Minerals help maintain electrolytes and acid-base balance, as well as regulate muscular action and nervous activities throughout the body. Water is part of almost every vital body process.

8. Apply the guidelines of the Food Guide Pyramid to dietary recommendations for patients. The food pyramid was revised in 2005, and for the first time dietary recommendations were linked to the importance of exercise in maintaining a healthy weight. The narrowing of each food group up the pyramid represents the importance of choosing more foods with limited added sugars and fats. Individually designed guidelines are available based on age and activity level. The widths of the food groups represent how much should be consumed from each group daily. Emphasis is on the importance of choosing a variety of nutritious foods each day. The USDA Web site (www.mypyramid.gov) provides learning opportunities to enhance understanding of the new guidelines.

9. Implement nutritional assessment techniques. The physician's assessment of the patient's nutritional status includes an evaluation of the patient’s current health and lifestyle habits, as well as body fat measurements. Body fat can be measured by using the waist to hip ratio, by using calipers to measure fat folds, or by calculating the BMI.

10. Correlate a patient's calculated BMI with the risk for diet-related disease. The BMI is the relationship of weight to height, which correlates with health risks. The BMI is a more accurate predictor of weight-related diseases than traditional height-weight charts, because it provides a good estimate of the degree of body fat. Individuals with a BMI of 19 to 22 are thought to live longest. The incidence of diet-related disorders, as well as the mortality rate, is significantly higher for people with a BMI of 25 or above.

11. Compare the concepts of therapeutic nutrition. Therapeutic nutrition uses various diets to help treat or prevent disease. Diets can be modified in many ways; these may include changes in consistency and taste, monitoring of caloric levels, altering the amounts and types of specific nutrients, and managing the fiber content of foods. Two examples of diet therapies are the diabetic diet and the heart healthy diet, both of which can have a significant impact on a patient’s wellness.

12. Interpret food labels and explain their application to a healthy diet. The federal government requires all food manufacturers to follow certain guidelines when labeling packages. Labels provide facts on the nutritional value of foods. The food label can be a valuable tool in patient compliance with specialized diets.

13. Demonstrate to the patient how to read nutrition labels on food products. Refer to Procedure 30-1.

14. Summarize the etiology and impact of eating disorders and obesity on a patient’s health. An eating disorder is defined as any eating behavior pattern that can lead to a health problem. In anorexia nervosa, profound malnutrition occurs because of an individual's attempt to control his or her life by not eating. Bulimia is characterized by bingeing and purging episodes. Obesity has become a national health emergency. Obese individuals have a higher risk of a wide range of health problems, including hypertension, diabetes mellitus type 2, coronary artery disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, and certain types of cancer.

15. Define the concepts of health promotion.
Health promotion considers all aspects of patient care, including the concepts of general wellness, adequate nutrition, environmental health and safety, health education needs, and disease prevention. The components of health promotion include exercise, stress management, regular physical examinations, and health counseling.

16. Describe the role of the medical assistant in nutrition and health promotion.

The medical assistant plays a key role in promoting nutrition and health. He or she serves as a patient advocate and as a liaison between the patient and community resources. It is important that medical assistants understand the various implications of nutrition and specific diets, so that they can answer patients' questions, which promotes compliance with treatment.

CONNECTIONS

📚 Study Guide Connection: Go to the Chapter 30 Study Guide. Read and complete the activities.

🌐 Evolve Connection: Go to the Chapter 30 link at evolve.elsevier.com/kinn to complete the Chapter Review and Chapter Quiz. Peruse other resources listed for this chapter to increase your knowledge of Nutrition and Health Promotion.