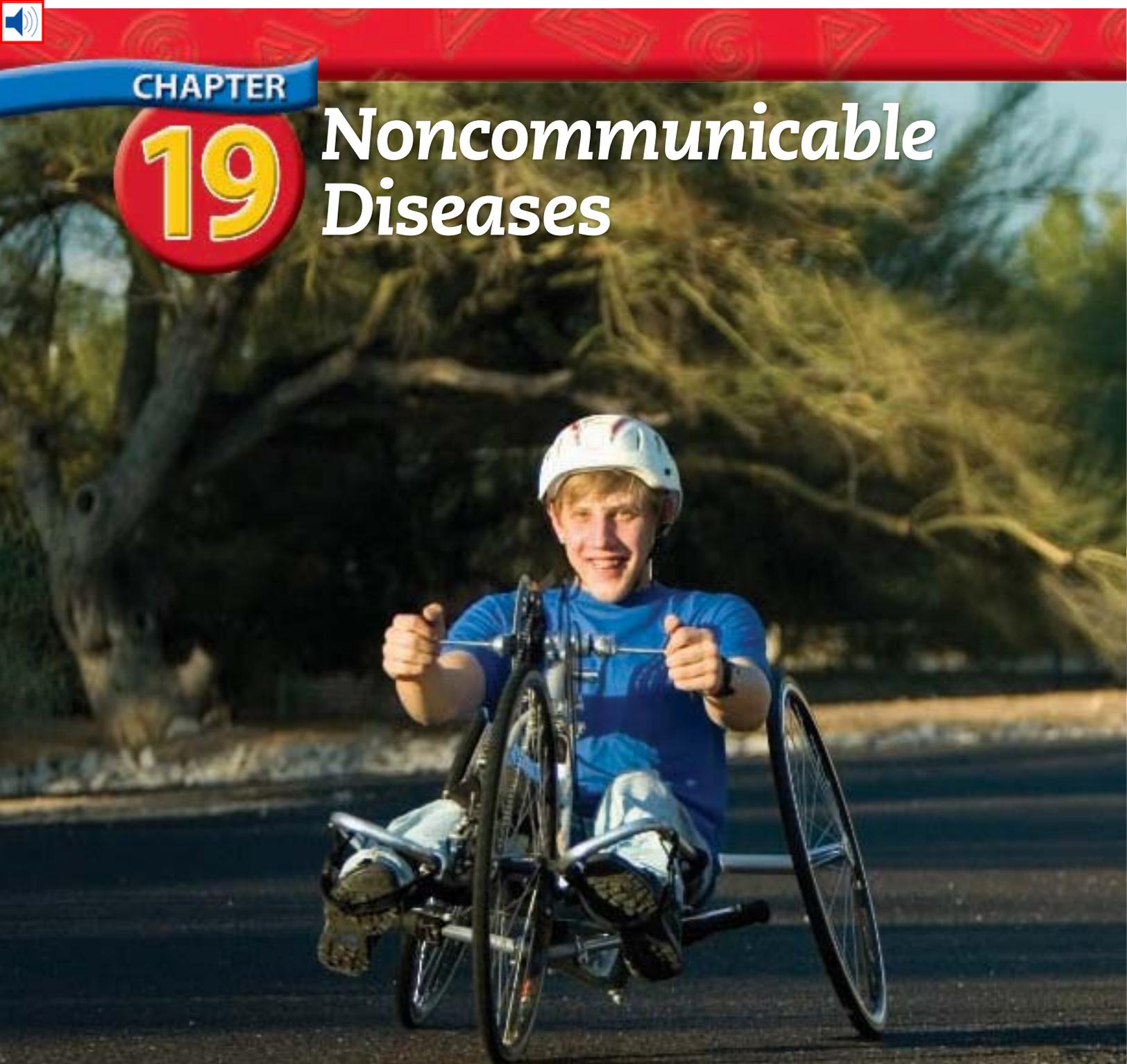




Noncommunicable Diseases



Chapter Preview

Lesson 1	Causes of Noncommunicable Diseases	508
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▲ Working with the Photo

Some noncommunicable diseases are present at birth. **What are some causes of noncommunicable diseases?**

Start-Up Activities

Before You Read

Do you practice healthy lifestyle behaviors that help to prevent noncommunicable diseases? Take the Health Inventory below. Keep a record of your answers.

HEALTH INVENTORY

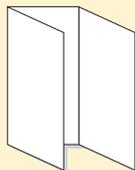
- I limit foods that are high in salt and fat.
(a) always (b) sometimes (c) never
- I am physically active each day.
(a) always (b) sometimes (c) never
- I manage stress in healthful ways.
(a) always (b) sometimes (c) never
- I apply sunscreen before I go outside.
(a) always (b) sometimes (c) never

FOLDABLES® Study Organizer

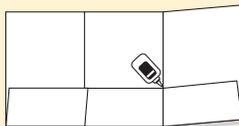
As You Read

Make this Foldable® to record and collect information on the causes of noncommunicable diseases presented in Lesson 1. Begin with a plain sheet of 11" × 17" paper.

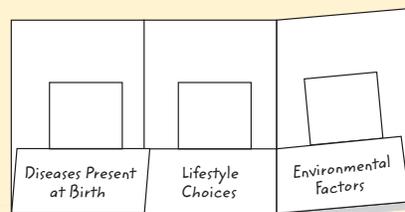
- 1** Fold the sheet of paper into thirds along the short axis.



- 2** Open and fold the bottom edge up to form a pocket. Glue the edges.



- 3** Label each pocket as shown.



Summarize key points on index cards on the different causes of noncommunicable diseases. Store these cards in the appropriate pocket of your Foldable®.

Go Online

Visit glencoe.com and use the eFlashcards to preview Chapter 19 vocabulary terms.

Lesson 1

Causes of Noncommunicable Diseases

Guide to Reading

Building Vocabulary

As you read the lesson, write each term and its definition in your notebook.

- noncommunicable diseases (p. 508)
- chronic diseases (p. 508)
- degenerative disease (p. 508)
- congenital disorder (p. 508)
- heredity (p. 509)

Focusing on the Main Ideas

In this lesson, you will learn to

- **identify** various types of noncommunicable diseases.
- **explain** some causes of noncommunicable diseases.
- **describe** some lifestyle behaviors that can prevent diseases.

Reading Strategy

Skimming Glance at the headings of this lesson. By looking over the major and minor headings, you will have an idea of what the lesson is about. Write three main ideas after skimming the lesson.

FOLDABLES Study Organizer Use the Foldable® on p. 507 as you read this lesson.

Quick Write

Make a list of as many factors as you can think of that can cause noncommunicable diseases.

**What Is a Noncommunicable Disease?**

As you learned in Chapter 18, you can get communicable diseases from other people. Some diseases, however, are noncommunicable. **Noncommunicable diseases** are *diseases that cannot be spread from person to person*. For example, you cannot catch diabetes from someone who has this disease. Some noncommunicable diseases are chronic. **Chronic diseases** are *present either continuously or on and off over a long period of time*. Asthma is a chronic disease.

Other noncommunicable diseases are considered degenerative. A **degenerative disease** is *a disease that causes a breakdown of the body cells, tissues, and organs as it progresses*. Multiple sclerosis is an example of a degenerative disease.

Diseases Present at Birth

Some babies are born with physical or mental disabilities caused by birth defects or genetic disorders. The causes of many birth defects are unknown. *All disorders that are present when the baby is born* are called **congenital disorders**. Examples of congenital disorders include cystic fibrosis and sickle-cell anemia. These two diseases are caused by hereditary factors.



Heredity is the passing of traits from parents to their children. Some birth defects are caused by the mother's choice of lifestyle. For example, a pregnant woman who drinks alcohol may give birth to a child with fetal alcohol syndrome (FAS).

 **Reading Check** **Recall** List three types of noncommunicable diseases.



Lifestyle Choices and Disease

While it is hard to determine who will develop a particular disease, researchers have found that certain risk factors increase a person's chance of developing a disease. Heredity, age, gender, and ethnic group are factors over which people have no control.



People can, however, control one major group of risk factors—their lifestyle choices. When people make unhealthy choices, they increase their risk of disease. Drinking too much alcohol, for example, can cause cirrhosis of the liver. Smoking tobacco can cause lung cancer and other respiratory diseases. Heart disease can result from eating too many foods that are high in saturated fat, and from a lack of physical activity. To decrease your risk of disease, practice the following healthy lifestyle behaviors:

- **Eat healthful foods.** Eat plenty of whole grains, fruits, and vegetables. Go easy on foods high in fat, sugar, or salt.
- **Stay physically active.** Teens should be physically active at least 60 minutes on most days. Regular physical activity strengthens the heart and lungs, and helps the body systems work better.
- **Maintain a healthy weight.** Keep your weight within the recommended range for your gender, age, height, and body frame.
- **Get enough sleep.** Teens need at least eight hours of sleep a night.
- **Manage stress.** Use time management and other healthful strategies to reduce stress.
- **Avoid tobacco, alcohol, and other drugs.** These substances harm many parts of the body.



- ▲ Multiple sclerosis (MS) is a degenerative disorder of the brain and spinal cord that causes problems with the use of limbs. **How might discovering the cause of MS help scientists find a cure or treatment?**



- ◀ Smog is one environmental factor that can cause respiratory diseases. **What are other environmental factors that can cause disease?**

Environmental Factors and Disease

Your environment affects your personal health. Many substances in the environment can cause serious health problems. When houses are built near landfills, for example, they can become contaminated by fumes from the chemical waste buried in the landfills. Illness can result years after initial exposure.

Carbon monoxide—a colorless, odorless gas—is another harmful environmental substance. Fumes from car exhaust and some furnaces and fireplaces emit carbon monoxide when used. High levels of carbon monoxide gas can be dangerous and cause serious illness or even death.

Smog is another environmental factor that can cause disease. Smog is a yellow-brown haze that forms when sunlight reacts with air pollution. Breathing smog can cause respiratory diseases in some people. When smog is especially heavy, people with respiratory diseases may need to limit their outdoor activities.

Go Online

Visit glencoe.com and complete the Interactive Study Guide for Lesson 1.

Lesson 1 Review

After You Read

Review this lesson for new terms, major headings, and Reading Checks.

What I Learned

1. **Vocabulary** Define *chronic diseases*. Give an example of one.
2. **Identify** What are three risk factors that can cause noncommunicable diseases?
3. **Describe** What are two environmental factors that can cause disease?

Thinking Critically

4. **Synthesize** How can lifestyle choices affect a person's health?

5. **Evaluate** How can communities lower the risk of diseases caused by the environment?

Applying Health Skills

6. **Accessing Information** Using print or online resources, research some common noncommunicable diseases. Choose one and create a fact sheet describing what causes the disease and how it affects the body. Include information on how this disease is treated or managed. Share your findings with the class.

Lesson 2

Cancer

Guide to Reading

Building Vocabulary

Write each term below and its definition on separate index cards. Mix up the cards and try to match each term to its definition.

- cancer (p. 511)
- tumor (p. 511)
- benign (p. 512)
- malignant (p. 512)
- risk factors (p. 513)
- carcinogens (p. 513)
- biopsy (p. 513)
- radiation therapy (p. 514)

- chemotherapy (p. 514)
- remission (p. 515)
- recurrence (p. 515)

Focusing on the Main Ideas

In this lesson, you will learn to

- **identify** common types of cancer.
- **recognize** some causes of cancer.
- **explain** ways that cancer can be treated.
- **describe** how to reduce the risk of developing cancer.

Reading Strategy

Organizing Information Create a chart that shows the different types and treatments of cancers.

What Is Cancer?

Cancer is a disease characterized by the rapid and uncontrolled growth of abnormal cells. It can affect people of any age. Although many cancers can be treated, cancer is the second leading cause of death in the United States.

How does cancer develop? More than 50 trillion cells make up the adult human body. Most of the cells are normal, but some are abnormal cells. Usually, your body's immune system destroys abnormal cells. When these cells survive, however, they begin to divide. As they divide, some of them grow into tumors. A **tumor** is a mass of abnormal cells.

- ▶ Before you go outdoors, apply sunscreen with an SPF of 15 or higher. **What other precautions can you take to protect your skin from the sun's ultraviolet rays?**

Quick Write

Write a couple of sentences that explain why people need to wear sunscreen when they go outdoors.





Celebrity Cancer Stories

The media often feature stories about prominent political, entertainment, and sports figures who have cancer.

Why do you think some public figures choose to publicize their cancer? What are the possible benefits of doing so?

Tumors can be either benign or malignant. **Benign** tumors are *not cancerous* and do not spread to other parts of the body. **Malignant** tumors are *cancerous*. They can spread to other parts of the body.

Types of Cancer

Cancer can develop in many parts of the body. Some types of cancer are more common than others. See **Figure 19.1** for some common types of cancer. Skin cancer is the most common type. Fortunately, if skin cancer is discovered early enough, it can be successfully treated.

Lung cancer is the leading cause of cancer deaths. In 2005, almost one out of every three people who died from cancer had lung cancer. There is good news, however. In recent years, the number of lung cancer deaths has fallen because fewer people are smoking. Smoking is the leading cause of lung cancer.

FIGURE 19.1

COMMON TYPES OF CANCER

This chart lists some common types of cancer. **What is the leading cause of skin cancer?**

Type of Cancer	Important Facts
Skin cancer	is the most common kind of cancer. Excessive exposure to direct sunlight is the major cause of skin cancer.
Breast cancer	most often occurs in women over 50. It can occur in younger women and occasionally in men.
Reproductive organ cancer	can occur in the testicles and prostate gland in men. It can occur in the ovaries, cervix, and uterus in women.
Lung cancer	is the leading cause of cancer deaths in the United States. Smoking is the biggest risk factor for both males and females.
Colon and rectal cancer	develop in the digestive tract. Early detection and better screening have greatly reduced the number of cases of colon and rectal cancers.
Leukemia	is a cancer of the white blood cells that starts in the bone marrow. An increase in cancerous white blood cells interferes with the healthy white blood cells' immune response.
Lymphoma	is a cancer that starts in the lymphatic system. It weakens the immune system and increases the risk of developing infections.



Risk Factors and Causes of Cancer

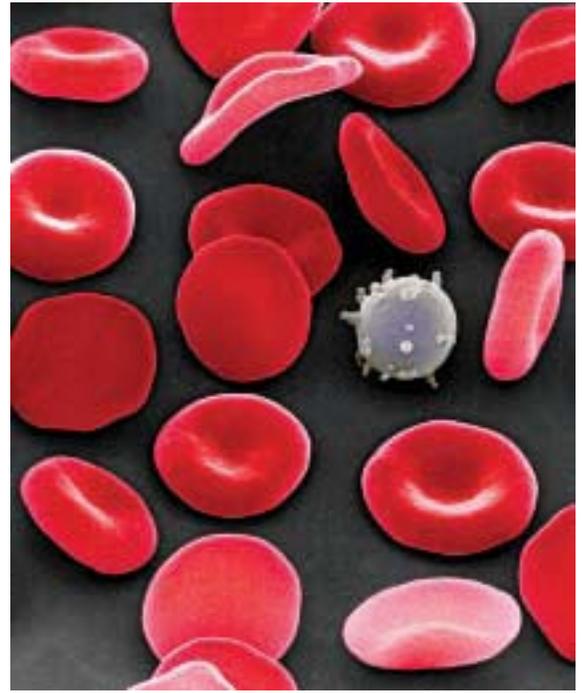
Although the causes of some types of cancers are unknown, scientists have identified certain risk factors. **Risk factors** are *characteristics or behaviors that increase the likelihood of developing a medical disorder or disease*. Heredity, age, lifestyle choices, and environmental factors are some of the risk factors that can increase a person's risk of cancer. For example, someone whose diet is high in saturated fats and low in fiber is at an increased risk for colon and rectal cancers.

Some types of cancer are caused by exposure to carcinogens (kar-SI-nuh-juhnz). **Carcinogens** are *substances that cause cancer*. For example, asbestos is a carcinogen. This material was used in construction and manufacturing until it was discovered to contain cancerous substances. Other common carcinogens are the chemicals in tobacco, which are linked to lung and mouth cancers. Not all carcinogens are chemicals. For instance, ultraviolet light from the sun can cause skin cancer. Radiation, including X-rays, can also cause cancer in large doses.



Reading Check

Recall Name two carcinogens and the types of cancers they cause.



Diagnosing Cancer

Health care professionals have many ways to begin checking for cancer. They can identify a group of abnormal cells when looking at the skin. They might feel a lump where the tissue should be soft. X-rays and other scanning equipment can also locate abnormal cell formations. If a suspicious lump or formation is discovered, a biopsy is usually done on the tissue. A **biopsy** is *the removal of a sample of tissue from a person for examination*. To diagnose cancer, the physician will examine tissue samples under a microscope to see if the cells are cancerous. If the cells are found to be cancerous, the patient will begin treatment. In order to diagnose cancer early, it is important to watch for warning signs. **Figure 19.2** on page 514 shows some of the warning signs of cancer. A person who shows a warning sign of cancer should be examined by a physician as soon as possible.

- ▲ Most cells in your body divide at a controlled rate. Cancer cells divide at an uncontrolled rate. **How are the normal cells in the top picture different from the cancer cells in the bottom picture?**





▼ FIGURE 19.2

THE WARNING SIGNS OF CANCER

These tools will help you recognize the warning signs of cancer.

What does the “U” in CAUTION stand for?

C **Change in bowel or bladder habits** Bleeding from the rectum is a warning sign of colorectal cancer. Reduced urine output could indicate prostate cancer.

A **A sore that does not heal** or that bleeds easily may indicate skin cancer or oral cancer if the sore is in the mouth or on the tongue.

U **Unusual bleeding or discharge** from the vagina may indicate uterine cancer. Blood in the urine could signal bladder or kidney cancer.

T **Thickening or lump in the breast or elsewhere** may indicate nonmalignant disease or cancer. All lumps should be checked.

I **Indigestion or difficulty in swallowing** could be a sign of cancer of the esophagus or stomach.

O **Obvious change in mole or wart** See the ABCDs of melanoma.

N **Nagging cough or hoarseness** may be a sign of lung cancer.

A **Asymmetry** One half doesn't match the other half.

B **Border** The border is irregular—edges are ragged or blurred.

C **Color** The color is not uniform and may contain shades of brown or black and possibly patches of red, white, or blue.

D **Diameter** The diameter is larger than the size of a pencil eraser (6 mm) or is getting bigger.

Treating Cancer

The best way to treat cancer depends on many factors. These include the type of cancer, the stage of the disease, and the age and general health of the patient. The following are the most common cancer treatments:

- **Surgery** removes cancer cells from the body. It is used for treating breast, skin, lung, and colon cancer, among others.
- **Radiation therapy** is a treatment that uses X-rays or other forms of radiation to kill cancer cells. The high-energy rays from radioactive substances destroy or shrink the cancer cells.
- **Chemotherapy** is the use of powerful medicines to destroy cancer cells. It is often used to fight cancers that have spread throughout the body, such as leukemia.

All treatments have side effects. For example, the side effects of radiation therapy and chemotherapy include nausea, fatigue,



◀ Health care professionals can often detect signs of cancer in several ways. **Why is early detection of some types of cancer so important?**

and temporary hair loss. When cancer treatment is successful, the cancer is in remission. **Remission** is *when cancer signs and symptoms disappear*. Cancer that is in remission can sometimes return. The return of cancer after a remission is called a **recurrence**.



Reading Check

Recall What is remission?



Reducing the Risk of Cancer

You can take an active role in promoting good health and reducing cancer risks. Here are some tips:

- **Avoid tobacco and alcohol.** Cigarette smoking is the single major cause of cancer deaths in the United States. Excessive alcohol use increases the risk of several types of cancer.
- **Limit sun exposure.** One way to protect yourself from UV rays is to limit your time in the sun. You should also apply a sunscreen with an SPF of at least 15 before you go outdoors. Wearing a hat that shades your neck, your face, and the tops of your ears is also a way to limit sun exposure.
- **Be physically active.** Be at least moderately active for 60 minutes or more on most days.
- **Perform self-examinations.** Females should perform monthly self-exams of their breasts. Males should perform a testicular self-exam once a month. Ask your health care provider for information on how to conduct both of these exams. In addition, check your skin regularly for moles and other skin growths. If you notice any changes in them, see a health care provider right away.



Reading Check

Explain What is meant by the ABCDs of checking moles?

Go Online

Visit glencoe.com and complete the Interactive Study Guide for Lesson 2.



Health Skills Activity

Advocacy

Reducing the Risk of Cancer

You can make healthy choices that will reduce your risk of getting certain cancers. Create a resource for your school. Collect information on some preventable cancers. Create a booklet on what teens can do to reduce their risk of getting some types of cancer. Start with this information:

- Lung and mouth cancer: avoid chewing and smoking tobacco.
- Skin cancer: limit exposure to the sun, and wear sunscreen with an SPF of at least 15 when outdoors.
- Liver cancer: avoid excessive use of alcohol.

In a Group

Design a booklet or computer presentation on healthy behaviors to prevent cancer. Think of a creative title for your booklet. Include a slogan and logo. Give your presentation or present your booklet to the class.

Lesson 2 Review

After You Read

Review this lesson for new terms, major headings, and Reading Checks.

What I Learned

1. **Vocabulary** Define *cancer*.
2. **Identify** What are four common types of cancer?
3. **Describe** Describe ways that cancer can be treated.
4. **Give Examples** What are three ways to reduce the risk of cancer?

Thinking Critically

5. **Synthesize** Why is it important to diagnose cancer as early as possible?

6. **Apply** Why do people with outdoor jobs have a higher risk of skin cancer than people who work indoors?

Applying Health Skills

7. **Advocacy** Amina noticed that a lot of the kids at the community pool don't wear sunscreen. She wants to create a pamphlet that talks about skin cancer and how it can be prevented. Create a similar pamphlet and hand it out to anyone who enjoys outdoor activities.

Lesson 3

Heart and Circulatory Problems

Guide to Reading

Building Vocabulary

To help you learn each vocabulary term, divide it into syllables. The smaller parts make the longer terms easier to pronounce and understand.

- arteriosclerosis (p. 518)
- atherosclerosis (p. 518)
- hypertension (p. 519)
- stroke (p. 519)
- heart attack (p. 519)
- angioplasty (p. 519)
- Body Mass Index (BMI) (p. 521)

Focus on the Main Ideas

In this lesson, you will learn to

- **identify** and describe different types of heart disease.
- **describe** how to treat heart disease.
- **explain** ways to reduce the risk of heart disease.

Reading Strategy

Identifying Cause-and-Effect List three lifestyle behaviors that can cause heart disease.

What Is Heart Disease?

The term *heart disease* describes any condition that weakens the heart and blood vessels and makes them less functional. More adults in the United States die from heart disease than from any other cause. In fact, in 2004, about 79,400,000 people were diagnosed with one or more forms of cardiovascular disease. That same year, 871,500 people died of the disease. The risk of heart disease depends partly on age and heredity. However, most heart disease is the result of lifestyle behaviors, such as smoking, eating too many foods high in

- ▶ Eating nutritious foods can help you maintain a healthy heart. **What other factors contribute to the health of your heart?**

Quick Write

What are three ways to keep your heart healthy?





saturated fat, and not getting enough regular physical activity. Teens who make healthy lifestyle choices are less likely to develop heart disease as adults.

Types of Heart Disease

Body cells must have a constant supply of fresh oxygen to survive. The body's tissues and organs depend on the flow of blood through the arteries to deliver oxygen to the cells. When the arteries are clear and healthy, the blood flows through them freely. When the arteries are damaged or blocked, the blood does not flow as well.

Two disorders can result from problems with the blood flow through the arteries. **Arteriosclerosis** is a group of disorders in which arteries harden and become more rigid. When the arteries become rigid, less blood is able to flow through them. **Atherosclerosis** occurs when fatty substances in the blood build up on the walls of the arteries. This buildup shrinks the space through which blood can travel. **Figure 19.3** shows how arteries can become blocked. If the space in the coronary arteries narrows, the heart may not get enough oxygen.

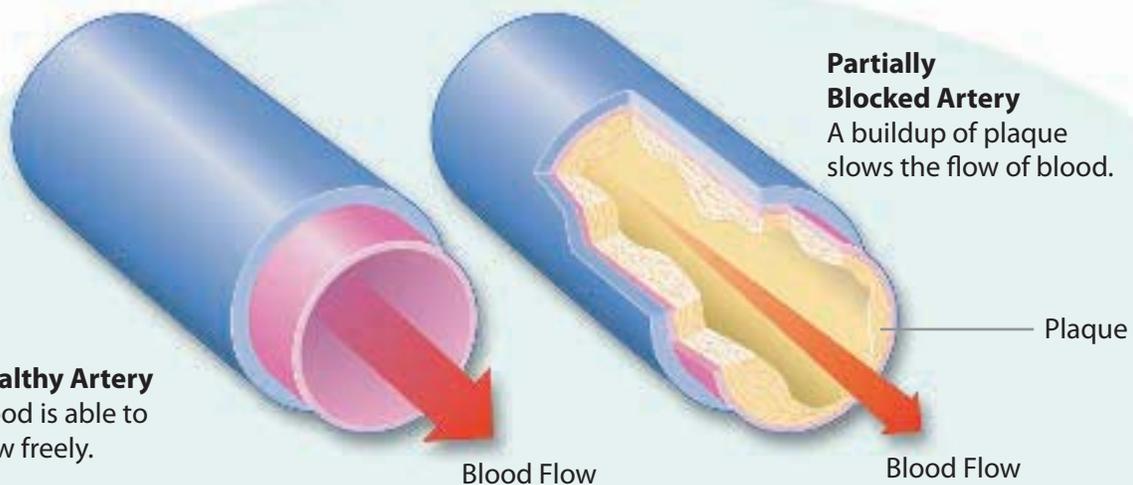


Explain What factors contribute to heart disease?

▼ **FIGURE 19.3**

HOW ARTERIES BECOME BLOCKED

The heart's muscle tissue gets blood from the coronary arteries. When arteries become blocked, the heart is prevented from getting the blood it needs. **What do you think might happen when the heart does not get enough blood?**



Other Cardiovascular Problems

As your heart beats, it pushes blood through your body's blood vessels, creating pressure on the blood vessels' walls. This force is called blood pressure. When a person's blood pressure is higher than normal, he or she has high blood pressure, or hypertension.

Hypertension is a condition in which the pressure of the blood on the walls of the blood vessels stays at a level that is higher than normal. High blood pressure can lead to a heart attack or a stroke. A **stroke** is a serious condition that occurs when an artery of the brain breaks or becomes blocked. Brain cells die from lack of oxygen, affecting the part of the body controlled by those cells.

Have your blood pressure checked regularly by a health care professional. Most hypertension can be treated with a healthful eating plan, physical activity, stress management, and medication.

Heart Attack

A **heart attack** is a condition in which blood flow to a part of the heart is greatly reduced or blocked. If the blood is cut off for more than a few minutes, the heart muscle cells are damaged and die. Heart attacks usually cause pain, tightness, or pressure in the chest, or pain spreading in the arms, jaw, back, or abdomen. Other symptoms may include cold skin, shortness of breath, sweating, fainting, nausea, and lightheadedness.



Reading Check

Compare What do heart attacks and strokes have in common?

Treating Heart Disease

To help people with heart disease, health care professionals use some of the following treatments:

- **Angioplasty** (AN·je·uh·plas·tee) is a surgical procedure in which an instrument with a tiny balloon, drill bit, or laser attached is inserted into a blocked artery to clear a blockage. These devices either flatten, cut, or burn away the blockage.
- **Medications** can dissolve blood clots that block arteries. Sometimes aspirin is prescribed to prevent platelets from clumping together to form blood clots.



Go Online

Topic: Taking Positive Action

Visit glencoe.com for Student Web Activities to learn more about how young people are taking action to help find cures for noncommunicable diseases like cancer, diabetes, and heart disease.

Activity: Using the information provided at the link above, create your own plan to help find a cure for one of the diseases mentioned in this lesson.

- ▼ Medication is one way to treat heart disease. **What are some other ways?**



Health Skills Activity

Analyzing Influences

Heart-Healthy Ads

Teens are surrounded by food ads in magazines, television, radio, newspapers, billboards, and other media. With heart disease receiving so much attention in the media, food makers have begun advertising many foods as “heart-healthy.” Find two advertisements in print, on the radio, or on television that advertise heart-healthy foods. Study the ads. How do the ads promote the foods? What language do they use? How do you think the ad writers want you to feel about eating the food? Do the ads contain any facts? Are these facts reliable? How can you tell?

In a Group

Create an advertisement for a delicious, heart-healthy meal. Include creative lettering, clipped magazine or newspaper pictures, and information about the food. Make your ad inviting, so teens are persuaded to try your heart-healthy meal.

- **Pacemakers** are electronic devices implanted into the chest to help the heart beat regularly. The pacemaker creates electrical signals that control the heartbeat.
- **Bypass surgery** creates new pathways for blood to flow around blockages. Surgeons can take a healthy blood vessel from another part of the body, such as the leg, and make a detour around the blocked part of the coronary artery.
- **Heart valve surgery** is when a faulty valve can be replaced with an artificial one made of metal or plastic.
- **Heart transplants** completely replace a person’s damaged heart with the healthy heart of someone who recently died. Heart transplants are extremely complicated, so they are done only when the heart is severely damaged and no other treatment will work.

How to Prevent Heart Disease

Although symptoms of heart disease usually do not appear until adulthood, heart disease can begin developing in childhood. Making healthy choices today can decrease your risk of



developing heart disease when you are older. Here are some **strategies** for keeping your heart healthy:

- **Eat healthful foods.** Eat a variety of fresh fruits and vegetables, whole-grain cereals, and lean sources of protein.
- **Participate in regular physical activity.** Regular physical activity strengthens the muscle tissue in your heart. Being active also helps you manage stress and maintain a healthy body weight.
- **Maintain a healthy BMI.** **Body Mass Index (BMI)** is a formula you can use to determine if your weight is appropriate for you. Your heart works best if your BMI is within a healthy range. Ask a health care provider to help you find the right range for you.
- **Manage stress.** Constant stress can lead to high blood pressure. Learn how to relax and reduce stress.
- **Stay tobacco free.** The chemicals in tobacco can lead to heart disease, heart attacks, hypertension, and even strokes.

Reading Check

Recall What kinds of foods reduce your risk of heart disease?

Academic Vocabulary

strategies (STRAT i jees) (*noun*) plans, methods, or a series of maneuvers. *Carmen and her doctor came up with a few strategies to help Carmen lose weight.*



Visit glencoe.com and complete the Interactive Study Guide for Lesson 3.

Lesson 3 Review

After You Read

Review this lesson for new terms, major headings, and Reading Checks.

What I Learned

1. **Vocabulary** Define *hypertension*.
2. **Identify** Name two types of heart disease. How are they similar? How are they different?
3. **Explain** What are some ways to reduce the risk of heart disease?
4. **Give Examples** What are three medical procedures that help people with heart disease?

Thinking Critically

5. **Analyze** Why is it a good idea to have your blood pressure checked regularly by a health care professional?

6. **Apply** What questions would you ask a health care provider if you want the provider to help you set up a plan to reduce your risk of heart disease?

Applying Health Skills

7. **Practicing Healthful Behaviors** Both of Tyler's grandfathers died of heart disease. Tyler wants to reduce his own risk of heart disease. Make a list of positive health behaviors Tyler can do to reduce his risk of heart disease.

Lesson 4

Diabetes and Arthritis

Guide to Reading

Building Vocabulary

Fold a sheet of paper in half to form two columns. Write each term on the left side of the fold and its definition on the other side. Fold the sheet in half again. Look at each term and quiz yourself on its definition. Flip over the paper and check the definition.

- diabetes (p. 522)
- insulin (p. 522)
- type 1 diabetes (p. 523)
- type 2 diabetes (p. 523)
- arthritis (p. 524)
- osteoarthritis (p. 524)
- rheumatoid arthritis (p. 525)

Focusing on the Main Ideas

In this lesson, you will learn to

- **describe** the different types of diabetes.
- **identify** the different types of arthritis.
- **explain** how to manage diabetes and arthritis.

Reading Strategy

Organizing Information Using the diagram below as a guide, create a table that helps you sort the information about diabetes and arthritis that appears in this lesson.

Diabetes	Arthritis
Types	Types
Ways to Manage	Ways to Manage

Quick Write

Write two facts that you already know about diabetes.

What Is Diabetes?

Diabetes (dy-uh-BEE-teez) is a disease that prevents the body from converting food into energy. People with diabetes are referred to as *diabetics*. Their bodies do not produce or properly use insulin.

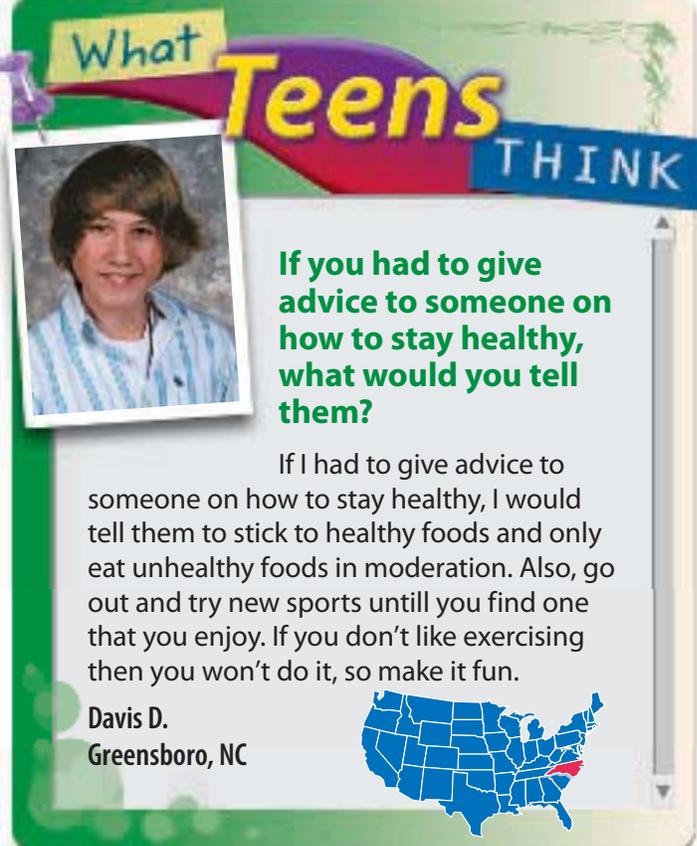
Insulin (IN-suh-lin) is a protein made in the pancreas that regulates the level of glucose in the blood. The body uses insulin to convert the food you eat into the energy that your body's cells need.

How does it work? Your body breaks down the food you eat into glucose, a simple sugar. The pancreas, sensing that you have eaten, releases insulin. The insulin allows glucose from the blood to enter the cells throughout the body. Diabetics either do not produce enough natural insulin, or cannot properly use their insulin to move the glucose into their cells. Instead, the glucose stays in the bloodstream and can cause many health problems. If not treated properly, diabetes can cause kidney problems, blindness, and heart disease.

Types of Diabetes

There are two main types of diabetes: type 1 and type 2. **Type 1 diabetes** is a condition in which the immune system attacks insulin-producing cells in the pancreas. When the cells that produce insulin are killed, the body cannot control how much glucose is in the bloodstream. Type 1 diabetes often starts in childhood, but it may also begin in adulthood. Somewhere between 5 and 10 percent of diabetics have type 1 diabetes.

Type 2 diabetes is a condition in which the body cannot effectively use the insulin it produces. In type 2 diabetes, the cells in the pancreas still make insulin, but the body does not use it well. Between 90 and 95 percent of diabetics have type 2 diabetes, which usually begins in adulthood. Obese people and physically inactive people are especially at risk. Type 2 diabetes is also becoming more and more common among children and teens.



What Teens THINK

If you had to give advice to someone on how to stay healthy, what would you tell them?

If I had to give advice to someone on how to stay healthy, I would tell them to stick to healthy foods and only eat unhealthy foods in moderation. Also, go out and try new sports until you find one that you enjoy. If you don't like exercising then you won't do it, so make it fun.

Davis D.
Greensboro, NC



Reading Check

Recall How does the body use insulin?

Managing Diabetes

Although there is no cure for diabetes, people with the disease can keep it under control and lead normal lives. Type 1 diabetics usually need to regularly inject insulin into their bodies. Or, they may receive insulin from a pump attached to their bodies. Even children with type 1 diabetes can learn to manage their condition. Type 2 diabetics may also need insulin or other medications. People with either type of diabetes can help control their disease by making healthy food choices, managing their weight, and being physically active. **Figure 19.4** on the next page shows ways people manage this condition.



Reading Check

Describe How can diabetes be managed?



Connect To...
Science



Monitoring Glucose Levels

Today's technology provides portable blood glucose monitors that can be used anywhere. Several models give voice instructions—in a choice of languages—to guide the user through the test procedure. The machine then announces the test results.

Who might benefit most from one of these "talking" blood glucose monitors?



▼ FIGURE 19.4

MANAGING DIABETES

People with diabetes can successfully learn to manage their condition. **What are some ways that people can use the following strategies in their daily lives?**



Healthful Food Plan

Medical professionals can help people with diabetes create a food plan that helps keep blood glucose levels within a healthy range.

Weight Management

To maintain a healthy weight, people with diabetes should engage in regular physical activity.

Insulin Injections

People with type 1 diabetes and some with type 2 diabetes usually inject insulin through a syringe or pump.

Medical Care

Diabetics should be under the care of a health care professional. He or she can monitor the diabetic's health and watch for problems.

What Is Arthritis?

Arthritis (ar·THRY·tus) is a disease of the joints marked by painful swelling and stiffness. More than 40 million people in the United States have arthritis. This disease is usually linked to older adults, but even children can get arthritis. The two most common types of arthritis are osteoarthritis and rheumatoid arthritis.

Osteoarthritis

Osteoarthritis (ahs·tee·oh·ahr·THRY·tuhs) is a chronic disease that results from a breakdown in cartilage in the joints. Cartilage cushions the place where bones meet in a joint. Osteoarthritis most often affects the knees and hips. When cartilage wears down, the bones in the joints rub against each other. This rubbing creates pain in the joint, swelling, and stiffness. Risk factors for osteoarthritis include age, heredity, and excess weight.



- ◀ This teen has juvenile rheumatoid arthritis (JRA), which causes joint pain and can limit movement. **What types of challenges might a teen with arthritis face?**

Rheumatoid Arthritis

Rheumatoid (ROO-muh-toyd) **arthritis** is a chronic disease characterized by pain, inflammation, swelling, and stiffness of the joints. This type of arthritis is more serious than osteoarthritis. People can develop rheumatoid arthritis when their immune system attacks healthy joint tissue, leading to painful swelling. Rheumatoid arthritis can affect any joint in the body, including joints in the shoulders, elbows, hands, hips, and feet. The joints affected by rheumatoid arthritis often become deformed and no longer function normally. Symptoms include soreness, joint pain and stiffness, body aches, and fatigue.



Reading Check

Name What are two common types of arthritis?

Managing Arthritis

Unfortunately, there is no cure for arthritis. However, people with this disease can develop a plan to reduce their symptoms and improve their personal health. Many plans involve a combination of the following healthy behaviors:

- **Physical activity and rest.** A key to managing arthritis is to develop a good balance between low-impact physical activity (such as walking and swimming) and rest. Physical activity can reduce swelling and help increase flexibility



Careers for the 21st Century

Family Practice Physicians



A family practice physician is a doctor who provides basic care for people of all ages. If a patient has a specific problem that requires specialized care, the family practice physician will refer the patient to a doctor who specializes in a particular illness or injury. There will always be a need for family practice physicians because people are living longer. If you would like to become a family practice physician, you should study the growth and development of humans, as well as the diseases and injuries that can affect them.

What kind of skills does a family practice physician need? Go to Career Corner at glencoe.com to find out.



in the joints. When people with arthritis get enough rest, it helps them cope with the fatigue they often experience.

- **A balanced eating plan.** Eating healthy foods helps maintain overall health and keeps weight under control.
- **Joint protection.** Braces and splints can sometimes be used to help support the joints.
- **Heat and cold treatments.** Hot baths can ease the pain of some kinds of arthritis. Cold treatments can help decrease the swelling.
- **Medication.** Some people who have arthritis take medicine to help ease the pain and swelling and to slow the inflammatory process.
- **Massage.** When given by a properly trained massage therapist, a very mild massage can help relax the joints and increase blood flow to sore areas.
- **Surgery and joint replacement.** Sometimes in extreme cases, surgeons can operate to repair or realign a joint. A joint may even be replaced with an artificial one.

Go Online

Visit glencoe.com and complete the Interactive Study Guide for Lesson 4.



Reading Check

Give Examples What are four ways to manage arthritis?



Lesson 4 Review



After You Read

Review this lesson for new terms, major headings, and Reading Checks.

What I Learned

1. **Vocabulary** What is *arthritis*?
2. **Describe** Describe the two different types of diabetes.
3. **Explain** What often happens to a joint affected by rheumatoid arthritis?

Thinking Critically

4. **Analysis** What do type 1 diabetes and rheumatoid arthritis have in common?
5. **Evaluation** Based on what you know about arthritis, how can you help someone with arthritis manage the disease?

Applying Health Skills

6. **Practicing Healthful Behaviors**

Participating in regular physical activity can help reduce your risk of developing type 2 diabetes. If you enjoy what you do, you are more likely to participate in the activity on a regular basis. List ten physical activities you enjoy or might enjoy doing. Make a check mark beside three activities you will participate in during the next month. Make a commitment to do each of these activities at least once a week.

Lesson 5

Allergies and Asthma

Guide to Reading

Building Vocabulary

As you read this lesson, write each term below and its definition in your notebook.

- allergy (p. 527)
- allergens (p. 527)
- pollen (p. 527)
- histamines (p. 528)
- hives (p. 528)
- antihistamines (p. 529)
- asthma (p. 530)
- bronchodilators (p. 531)

Focusing on the Main Ideas

In this lesson, you will learn to

- **describe** how to manage an allergic reaction.
- **explain** what happens during an asthma attack.
- **identify** ways to manage asthma.

Reading Strategy

Comparing and Contrasting Identify the similarities and differences between the symptoms and treatments of allergies and asthma.

Quick Write

List three allergy symptoms. How can they be managed?

What Are Allergies?

Your immune system reacts to foreign substances in your body by trying to weaken or eliminate them. As it reacts, it releases antibodies that fight the foreign substances. Sometimes, your immune system reacts to a fairly harmless substance. This reaction is known as an allergic response. An **allergy** is *an extreme sensitivity to a substance*.

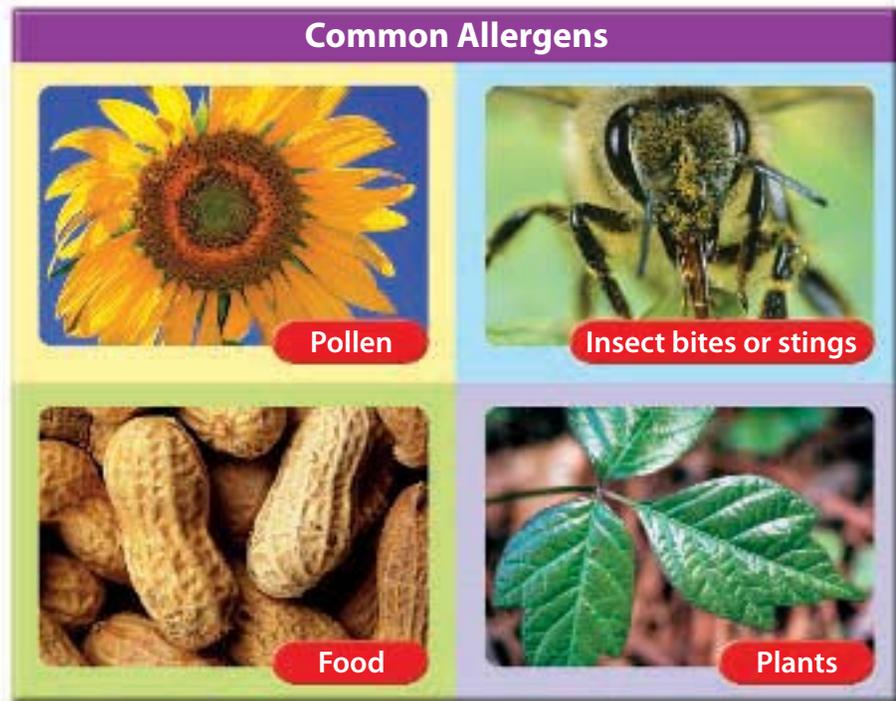
A person can be allergic to a number of different substances in the environment. *Substances that cause allergic responses* are called **allergens**. Allergens are very small. **Figure 19.5** on the next page illustrates some common allergens. When an allergen enters or comes in contact with a person's body, the immune system reacts as though it were harmful. When people are allergic to cats, for example, their allergic response is usually caused by dander on the cat's skin or fur. When people are allergic to ragweed, it is the tiny pollen grains from the plant that cause the allergic reaction, not the plant as a whole. **Pollen** is *a powdery substance released by the flowers of some plants*. It is lightweight, so it can be carried long distances and easily inhaled. When pollen comes into contact with a person who is allergic to it, the pollen causes an allergic reaction.



▼ FIGURE 19.5

COMMON ALLERGENS

Some allergens are easier to avoid than others. **What kind of difficulties do people who suffer from allergies face?**



Academic Vocabulary

contact (KON takt) (*noun*)
the act of touching.

When Estella comes into contact with cats, she has an allergic reaction.

Allergic Reactions

When someone comes into **contact** with an allergen, their body's immune system believes that this substance is harmful to the body. In order to protect the body, the immune system produces chemicals called **histamines** (HIS-tuh-meenz) and releases them into the bloodstream. Histamines are *the chemicals in the body that cause the symptoms of the allergic reaction*. **Figure 19.6** shows some of the symptoms a person may experience during an allergic reaction. Allergic reactions can range from minor irritations to severe problems. For example, some people get hives as a reaction to an allergen. **Hives** are *raised bumps on the skin that are very itchy*. Most allergic reactions happen within seconds or minutes of the time the allergen enters the body.

Some people are at risk for severe allergic reactions, including throat swelling or extreme difficulty breathing. Because they might die if they are not treated immediately, these people may need to carry medicine called *epinephrine*. Epinephrine slows down or stops the allergic reaction by preventing the body from releasing histamines.



Reading Check

List What are five ways that the body responds to allergens?



How to Manage Allergies

Although there is no cure for allergies, there are three basic ways to manage them.

- **Avoid the allergen.** If you have a food allergy, learn to read ingredient labels. Ask about the ingredients of foods in restaurants. Avoid plants or animals that you are allergic to.
- **Take medication.** People with allergies often take medicines that help reduce allergy symptoms. **Antihistamines** are medicines that help control the effects triggered by histamines. For example, antihistamines may relieve itching and redness around the eyes and nose.
- **Get injections.** In severe cases, a long-term series of injections is needed. The injections contain a tiny amount of the allergen to help the body build up immunity.



Reading Check

Describe What are three methods that people can use to manage allergies?

▼ FIGURE 19.6

THE BODY'S RESPONSES TO ALLERGENS

Allergic reactions vary depending on the allergen. Different people react differently to the same allergen. **Which allergic reaction do you think has the most dangerous health consequences?**

Body Responses to Allergens

Eyes

redden, itch, water, eyelids swell

Respiratory System

runny nose, sneezing, coughing, difficulty breathing

Throat

difficulty swallowing

Skin

redness, rash, hives, itching

Digestive System

pain, cramps, diarrhea, nausea





What Is Asthma?

Asthma is a condition in which the small airways in the lungs narrow, making breathing difficult. More than 20 million people in the United States have asthma. About 6 million of these people are under 18 years old. Some people outgrow their asthma, while others develop this disease in adulthood.

Asthma attacks can be triggered by many substances and conditions. A substance that triggers an attack in one person may have no effect on someone else. Common triggers include tobacco smoke, air pollution, and animal dander. Cold air, strenuous physical activity, strong emotions, and stress can also trigger an asthma attack. **Figure 19.7** explains what happens during an asthma attack.

- ▲ Many people with asthma carry inhalers that contain bronchodilators. **What are some other ways to manage asthma?**

Reading Check

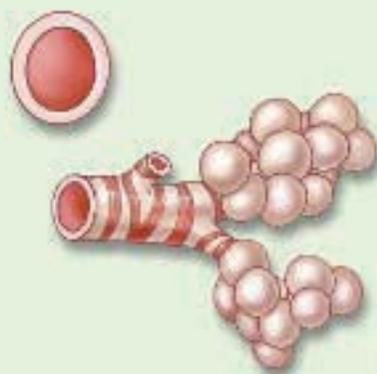
Recall What are some common triggers of asthma attacks?

FIGURE 19.7

ASTHMA ATTACK

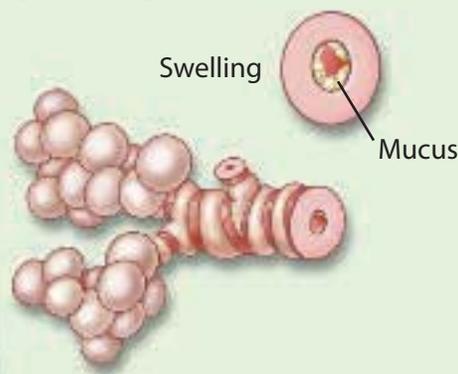
During an asthma attack, air passages become constricted and clogged with mucus. **What are some symptoms of an asthma attack?**

A Healthy bronchial tubes are clear and open. Air passes easily through them to fill tiny air sacs in the lungs.



Normal, clear airways

B During an asthma attack, muscles around the bronchial tubes tighten. The tubes narrow and their inner lining swells. Excess mucus clogs airways, making breathing difficult.



Tightened airways

How to Manage Asthma

Since there is no cure for asthma, most people with the disease learn to manage it and lead active lives. Managing asthma is often a team effort. Parents or trusted guardians, health care professionals, and friends can help people with asthma stay healthy. Here are some strategies that people with asthma can use to help avoid asthma attacks:

- **Manage the environment.** Avoid triggers that can cause asthma attacks.
- **Manage stress.** Stress is a major cause of asthma attacks. Learn to manage stress in healthful ways.
- **Take medication.** Relievers and controllers are two kinds of asthma medicines. **Bronchodilators** are *reliever medications used to relax the muscles around the air passages*. They help reduce symptoms during an asthma attack. Controller medications are often taken daily and help prevent asthma attacks from occurring.



Reading Check

Describe How can a teen with asthma reduce triggers in the surrounding environment?



Visit glencoe.com and complete the Interactive Study Guide for Lesson 5.

Lesson 5 Review



Review this lesson for new terms, major headings, and Reading Checks.

What I Learned

1. **Vocabulary** Define *allergy* and *asthma*.
2. **Give Examples** What are three ways to manage an asthma attack?
3. **Describe** What are some common symptoms of an allergic reaction?
4. **Identify** Name four common types of allergens.

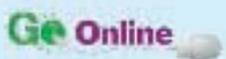
Thinking Critically

5. **Synthesize** If your friend is having an asthma attack, what are two ways you could help?

6. **Hypothesize** If someone has a food allergy, why do you think it is important for that person to be careful when eating in restaurants?

Applying Health Skills

7. **Communication Skills** Alisha tried out for the cheerleading team and made it! She has asthma, however, and is too embarrassed to tell anyone about it. Write a short letter to Alisha and tell her why you think she should tell her coach and teammates that she has asthma. How can she manage her asthma during practice and games?



For more Lesson Review Activities, go to glencoe.com.

Building Health Skills

Accessing Information
Practicing Healthful Behaviors
Stress Management
Analyzing Influences
Communication Skills
Refusal Skills
Conflict Resolution
Decision Making

Goal Setting

Advocacy

What Is Goal Setting?

Goal setting is a five-step plan for improving and maintaining your personal health. Some goals are easy to reach while others may be more challenging.

The 5 Steps of the Goal-Setting Plan

- Step 1:** Choose a realistic goal and write it down.
- Step 2:** List the steps that you need to take to reach the goal.
- Step 3:** Find others, like family, friends, and teachers, who can help and support you.
- Step 4:** Set checkpoints along the way to evaluate your progress.
- Step 5:** Reward yourself once you have reached your goal.

Lifelong Good Health Habits

Follow the Model, Practice, and Apply steps to help you master this important health skill.

1 Model

Read how Sasha uses goal setting to prepare for her first 10-mile race.

Sasha is excited about the upcoming 10-mile race. The race is a fundraiser for diabetes research. Sasha has diabetes and wants to support the event. She is physically fit but has never jogged 10 miles.

Sasha decides to set a goal of participating in the race. First, she writes down her goal—jogging in the race. Next, she outlines a program that she can follow to prepare for the 10-mile run. Sasha uses a calendar to schedule her workouts and evaluate her progress. She also decides that she will reward herself with a new pair of running shoes when she reaches her goal. She follows the steps, raises \$350 through sponsorships, and ends up having a lot of fun.



2 Practice

Read how Sanjay uses goal setting to learn how to manage his asthma and prepare for his trip to Los Angeles, CA.

Sanjay is excited to go on his family trip to Los Angeles. However, he has been diagnosed with asthma. Sanjay would like to learn how to manage his asthma well enough so that he can go on the trip and have a good time.

1. What is Sanjay's goal?
2. What are the steps Sanjay needs to take to reach his goal?
3. Whom can Sanjay go to for help?
4. How can Sanjay evaluate his progress?
5. What is Sanjay's reward?



3 Apply

Use what you have learned about goal setting to complete the activity below.

Think of a physical activity that you want to try, such as in-line skating or bicycling. Choose an activity that will reduce your risk of heart disease. Set a goal to do this activity. Use the goal-setting process to show how you will achieve this goal. Explain how achieving your goal will keep your heart healthy.

Self-Check

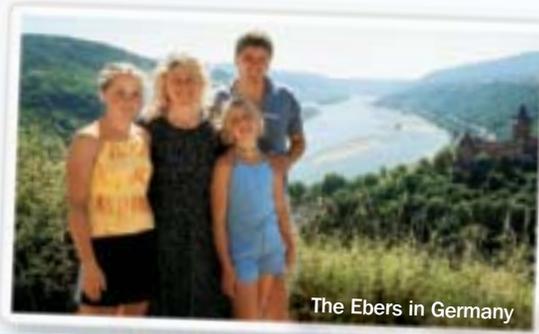
- Did I use all of the steps for goal setting?
- Did I explain how attaining this goal will protect my heart?

The Eber family bikes around the world to help fight asthma.

The Road to A CURE

Recently, the four members of the Eber family rode their bikes to the U.S. Capitol in Washington, D.C. It was no lazy Saturday-morning outing. It was the last leg of a 16-month bike trip around the world. Paula, Lorenz, Anya, and Yvonne Eber pedaled more than 9,300 miles and visited 24 countries. Their mission: to raise awareness of—and money for—asthma.

“Asthma is a big problem,” Anya, 15, said. The disease makes it hard for as many as 150 million people



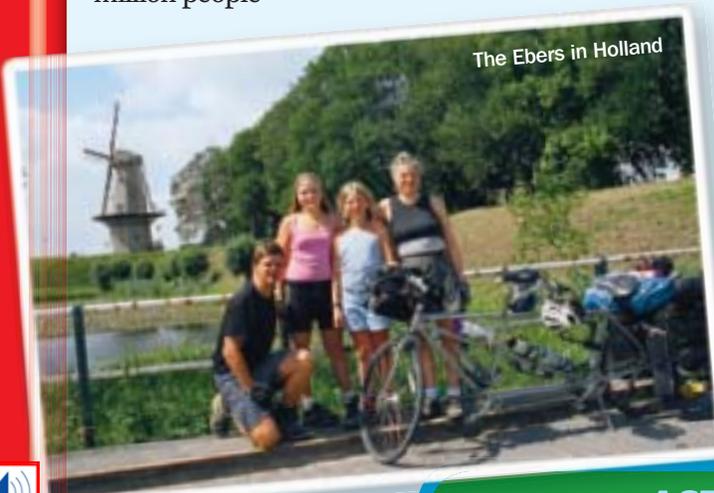
The Ebers in Germany



Paula, 45, knows how hard having asthma can be. As a child, her severe case forced her to spend months in bed. Medications that enabled her to participate in sports weren't available until she was a teenager. “A lot of kids [with asthma] today still don't get to live an active life,” Paula explains.

The Ebers have taken many bike trips, but nothing like this one! Highlights included eating a Christmas dinner of Chinese duck in Hong Kong and celebrating Yvonne's 12th birthday with coconut-and-mango cake in Tonga, which is located in the Pacific Ocean. On most of the journey, the family slept in tents. The hardest part, Yvonne says, was braving the heat, wind, rain, and bugs.

While on the road to help find a cure, the Ebers furthered their love of nature. Returning to life at their home in Bainbridge Island, Washington, wasn't easy. “I've had school outdoors for months,” Anya says. “It will be so weird to sit at a desk!”



The Ebers in Holland

throughout the world to breathe. The Ebers hope to collect donations for World Bike for Breath, the organization that they began. The money will be spent on asthma research and programs for kids who have the illness.

ASTHMA BY THE NUMBERS

With today's treatments, experts say most kids with asthma shouldn't experience too many symptoms. However, according to the latest information...

- Nine million U.S. children under the age of 18 have been diagnosed with asthma.
- Asthma accounts for 12.8 million absences from school each year.
- Asthma is the third most common cause of hospitalizations for children under 15 years old.



Visit glencoe.com to download quizzes and eFlashcards for Chapter 19.

FOLDABLES® Study Organizer

Foldables® and Other Study Aids Take out the Foldable® you created for Lesson 1 and any graphic organizers that you created for Lessons 1–5. Find a partner and quiz each other using these study aids.

Lesson 1 Causes of Noncommunicable Diseases

Main Idea Noncommunicable diseases are diseases that cannot be spread from person to person.

- Some noncommunicable diseases are chronic, while others are degenerative.
- Congenital disorders are noncommunicable diseases that are present at birth.
- Risk factors include heredity, lifestyle choices, and environmental factors.

Lesson 2 Cancer

Main Idea Cancer is characterized by the rapid, uncontrolled growth of abnormal cells.

- Types of cancer include: skin, breast, reproductive organ, lung, colon, rectal, leukemia, and lymphoma.
- Use C.A.U.T.I.O.N. and the ABCDs to remember the warning signs of cancer.
- Three common cancer treatments are radiation therapy, chemotherapy, and surgery.
- To reduce cancer risks, avoid tobacco and alcohol, limit sun exposure, be physically active, and perform self-examinations.

Lesson 3 Heart and Circulatory Problems

Main Idea Heart disease is any condition that weakens the heart or impairs the way it functions.

- Cardiovascular problems include hypertension, stroke, arteriosclerosis, atherosclerosis, and heart attack.
- Eating healthful foods, exercising, maintaining a healthy BMI, managing stress, and staying tobacco and drug free keep your heart healthy.

Lesson 4 Diabetes and Arthritis

Main Idea Type 1 diabetes and juvenile rheumatoid arthritis often begin in childhood.

- Diabetes is a disease that prevents the body from converting food into energy.
- There are two types of diabetes: type 1 and type 2.
- Arthritis is a joint disease marked by painful swelling and stiffness.
- Osteoarthritis and rheumatoid arthritis are the two common types of arthritis.

Lesson 5 Allergies and Asthma

Main Idea Allergies and asthma can be managed with medicine, and by avoiding allergens.

- An allergy is an extreme sensitivity to a substance or allergen.
- Common allergens include pollen, insect bites or stings, food, and plants.
- Asthma occurs when the airways in the lungs narrow, making it difficult to breathe.

After You Read

HEALTH INVENTORY

Now that you have read the chapter, look back at your answers to the Health Inventory in the chapter opener. Is there anything you should do differently?

Reviewing Vocabulary and Main Ideas

On a sheet of paper, write the numbers 1–8. After each number, write the term from the list that best completes each statement.

- chronic
- heart attack
- degenerative
- arteriosclerosis
- heredity
- risk factors
- tumor
- benign
- malignant
- stroke

Lesson 1 Causes of Noncommunicable Diseases

1. _____ disease symptoms are present continuously or off and on over a long period of time.
2. Some noncommunicable diseases can be the result of _____.

Lesson 2 Cancer

3. A group of abnormal cells in the body is called a(n) _____.
4. When tumors are cancerous, they are called _____.
5. _____ are characteristics or behaviors that increase the likelihood of developing a medical disorder or disease.

Lesson 3 Heart and Circulatory Problems

6. _____ is a group of disorders in which arteries harden and become more rigid.
7. When the blood supply to the heart slows or stops and the heart muscle is damaged, a(n) _____ can happen.
8. When an artery of the brain breaks or becomes blocked, the person may have a(n) _____.

On a sheet of paper, write the numbers 9–14. Write **True** or **False** for each statement below. If the statement is false, change the underlined word or phrase to make it true.

Lesson 4 Diabetes and Arthritis

9. Arthritis is a disease of the joints marked by painful swelling and stiffness.
10. Type 1 diabetes is the most common form of the disease.
11. Keeping physically active helps manage diabetes.

Lesson 5 Allergies and Asthma

12. Hives are a powdery substance released by the flowers of some plants.
13. Chemicals in the body that cause the symptoms of an allergic reaction are called allergens.
14. A serious chronic condition that causes air passages in the respiratory system to become narrow or blocked is asthma.



Applying Technology

Noncommunicable Diseases Q & A

You and a partner will use PowerPoint® to create a question and answer game that covers the various elements of noncommunicable diseases discussed in this chapter.

- Create a list of 20 questions and 20 answers from the chapter content.
- Open a new PowerPoint® project. You will need 42 slides. Each question gets a slide. Each answer gets a slide. The first slide is for the title of your game. The last slide will contain any concluding remarks you want to make about noncommunicable diseases.
- Enter all of your written content into the slides. Edit for clarity. Save your game.
- Exchange your game with another group's game.

Thinking Critically

Using complete sentences, answer the following questions on a sheet of paper.

- 15. Apply** If someone has arthritis, why might swimming be helpful?
- 16. Hypothesize** Why might people who are allergic to flower pollen experience fewer symptoms in places with cold winters?

Write About It

- 17. Informative Writing** Interview someone you know who is a diabetic. Write a paragraph describing how diabetes has affected this person's life. Include the healthy ways he or she manages the disease.

Standardized Test Practice

Math

Acute lymphoblastic leukemia (A.L.L.) is a serious disease that affects the white blood cells in the body. This table shows the survival rates of patients with A.L.L.

Use the table to answer the questions.

Survival Rates for A.L.L. Patients	
	% of Patients Surviving at Least 5 Years
Adults	40%
Children	80%

TEST-TAKING TIP

When you are trying to find trends by studying the data from a chart, it often helps to sketch a line graph of the data.

- Which is a *false* statement about the disease, according to the table?
 - Sixty percent of adults don't survive.
 - More adults survive than children.
 - More children survive than adults.
 - Twenty percent of children don't survive.
- By reading this chart, you can determine:
 - the survival rate for adults in ten years.
 - that most children who have this disease survive for at least five years.
 - the survival rate for children in ten years.
 - the survival rate for African American children after five years.