

Lesson 1

Cardiovascular Diseases

VOCABULARY

noncommunicable disease
cardiovascular disease (CVD)
hypertension
atherosclerosis
angina pectoris
arrhythmias

YOU'LL LEARN TO

- Examine different types of cardiovascular diseases.
- Recognize the importance of early detection and warning signs that prompt individuals to seek health care.
- Identify risk behaviors and risk factors for cardiovascular diseases.
- Develop, analyze, and apply strategies related to the prevention of cardiovascular diseases.



QUICK START

Brainstorm a list of heart-healthy habits. Briefly explain how you think each one benefits your heart.

V Every day your heart pumps blood through the arteries to all the cells of your body. *Why should you establish and maintain healthful habits to care for your heart?*



A century ago communicable diseases were a leading cause of death in the United States. Since then, the average life span of Americans has nearly doubled, primarily because of public health efforts and new technologies. Today, however, major causes of death, such as heart disease and cancer, come from a different kind of disease. A **noncommunicable disease** is a disease that is not transmitted by another person, a vector, or the environment. Medical science has identified certain habits and behaviors that either increase or decrease the risk of many of these diseases.

Cardiovascular Diseases

Your cardiovascular system transports blood to all parts of your body. Without oxygen and other materials that blood carries, your cells would die. Sometimes diseases interfere with the pumping action of the heart or the movement of blood through blood vessels. A **cardiovascular disease (CVD)** is a disease that

affects the heart or blood vessels. Approximately 61 million Americans have some form of the disease. CVDs are responsible for more than 40 percent of all deaths in the United States, killing almost a million Americans each year.

Types of Cardiovascular Disease

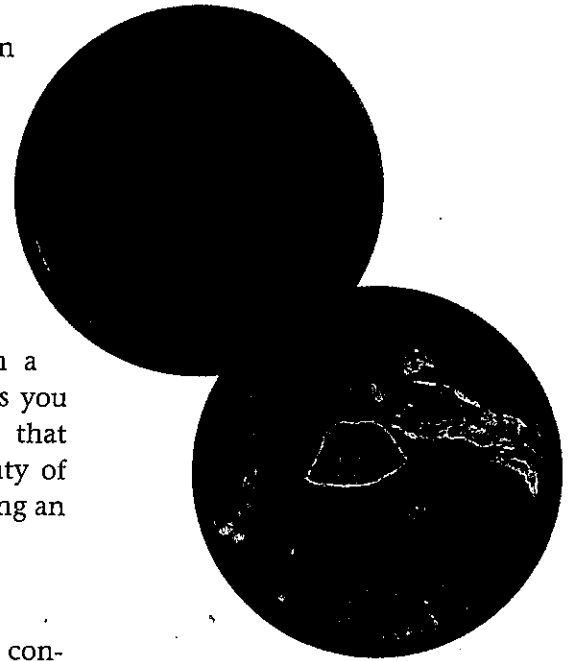
The heart, blood, and blood vessels are the main parts of the circulatory system. When the parts work together properly, the cardiovascular system runs efficiently. When a problem affects one part, the entire system is threatened. As you read the description of each type of CVD, keep in mind that you can reduce your risk by avoiding tobacco; getting plenty of physical activity; maintaining a healthful weight; and following an eating plan low in saturated fat, cholesterol, and sodium.


Hypertension

Blood pressure is the force of blood created by the heart's contractions and the resistance of the vessel walls. Normal blood pressure varies with age, height, weight, and other factors. **Hypertension** is *high blood pressure*—pressure that is continually above the normal range for a particular person. If high blood pressure continues over a long period, the heart, blood vessels, and other body organs will be damaged. Hypertension is a major risk factor for other types of CVDs. Hypertension can occur at any age, but it is more common among people over the age of 35. Of Americans aged 20–74, 23 percent have hypertension. CVD, considered a “silent killer,” often has no symptoms in its early stages, so it's important to get your blood pressure checked regularly. High blood pressure can be lowered with medication, weight management, adequate physical activity, and proper nutrition.

Atherosclerosis

At birth, the lining of blood vessels is smooth and elastic. Over time, factors such as tobacco smoke, high blood pressure, or high cholesterol levels can damage the inner lining of the arteries. Fatty substances in the blood, called plaques, can build up on the artery walls, causing the arteries to thicken and lose their elasticity. The process in which plaques accumulate on artery walls is called **atherosclerosis** (a-thuh-roh-skluh-ROH-sis). This buildup is due mainly to food choices—specifically, a high intake of saturated fats and cholesterol. Sometimes, a blood clot forms in the area of plaque. The clot grows until it blocks the artery. If the affected artery feeds the heart or the brain, a heart attack or stroke may result.



 The artery on the left is healthy. The one on the right shows evidence of atherosclerosis. What dietary choices can you make to lower your risk of atherosclerosis?

Did You Know

→ Blood pressure is written as two numbers. The first number is the *systolic* number, which represents the pressure while the heart is beating. The second, or *diastolic*, number represents the pressure when the heart is resting between beats. For example, 122/76 represents a systolic pressure of 122 and a diastolic pressure of 76. High blood pressure in adults is defined as 140/90 or above.



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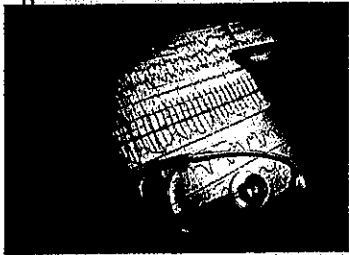



heart For more information about the structure of the heart and the cardiovascular system, see Chapter 16, page 417.

Diseases of the Heart

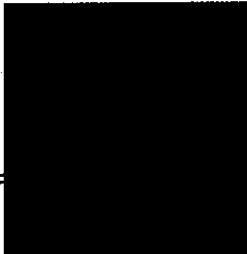
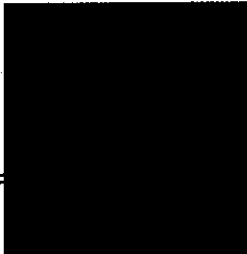
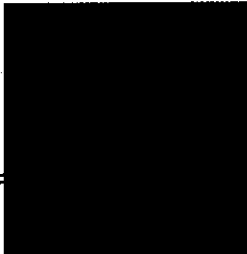

Your **heart** pumps about 100,000 times a day every day blood to all parts of your body. Just like every other organ, the heart needs the oxygen from blood to function. When the blood supply to the heart is insufficient to provide enough oxygen, the result can be pain, damage to the heart muscle, or even death. Methods for diagnosing and treating diseases of the heart and other CVDs are summarized in **Figure 26.1**.

FIGURE 26.1

DIAGNOSTIC TOOLS

EKG	MRI	Radionuclide Imaging	Angiography
<p>An electrocardiogram produces a graph of the electrical activity of the heart. It helps detect the nature of a heart attack and shows heart function.</p> 	<p>Magnetic resonance imaging uses powerful magnets to produce images of internal body organs. The images are used to identify heart damage and heart defects.</p> 	<p>Radionuclides injected into the blood can be observed on a computer screen as they pass through the heart. This procedure is used to assess the heart's blood supply and to show heart function.</p> 	<p>A thin, flexible tube is guided through blood vessels to the heart. Dye is injected and X-rays are taken to look for heart obstructions.</p> 

TREATMENT OPTIONS

Coronary Bypass	Angioplasty	Medications	Pacemaker
<p>Often a healthy vein is removed from the leg or chest and placed elsewhere to create a detour around a blocked artery.</p> 	<p>A tube with a balloon is inserted into a blocked artery. The balloon is inflated against the artery walls. Then it is deflated and removed. A metal structure may remain to keep the artery open.</p> 	<p>A variety of medications are used to treat CVDs. These include diuretics to aid with the body's fluid balance, cholesterol-lowering drugs, and drugs that slow the blood's clotting mechanisms in order to reduce risk of stroke.</p> 	<p>Pacemakers are used to treat an irregular heartbeat. The small device sends steady electrical impulses to the heart to make it beat regularly.</p> 

ANGINA PECTORIS

Angina pectoris (an-JY-nuh PEK-tuh-ruhs) is chest pain that results when the heart does not get enough oxygen. This pain, which usually lasts a few seconds to minutes, is a signal that the heart is temporarily not getting enough blood. The most common cause of angina is atherosclerosis. Angina seldom causes permanent heart damage and sometimes can be treated with medication.

ARRHYTHMIAS

Arrhythmia is a change in the regular beat of the heart. The heart may seem to skip a beat or beat irregularly, very quickly, or very slowly. **Arrhythmias** or *irregular heartbeats*, are common. They occur in millions of people who do not have underlying heart disease, and they usually don't cause problems. However, certain types of arrhythmias are serious. In one type of arrhythmia, called *ventricular fibrillation*, the electrical impulses regulating heart rhythm become rapid or irregular. This is the most common cause of sudden cardiac arrest, in which the heart stops beating without warning. Without immediate emergency help, death follows within minutes.

HEART ATTACK

Each year in the United States, there are more than one million cases of heart attack, and more than 40 percent of those affected die. A heart attack is damage to the heart muscle caused by a reduced or blocked blood supply, usually because of atherosclerosis. Often, ventricular fibrillation occurs seconds to hours or even days following a heart attack and can cause sudden death.

Many heart attacks are sudden and cause intense chest pain, but one in four produces no symptoms and is detected only when routine tests are done later. Most heart attacks start slowly with mild pain or discomfort, which is often mistaken for indigestion. Immediate response to warning signs can often mean the difference between life and death.

CONGESTIVE HEART FAILURE

A heart attack is an immediate response to stress on the heart. Sometimes, however, the heart gradually weakens to the point that it cannot maintain its regular pumping rate and force. The result is a condition called congestive heart failure. This condition can be a result of high blood pressure, atherosclerosis, a heart valve defect, or other factors. Illegal drug use can also bring on this condition by increasing heart rate. Congestive heart failure can be managed with medication and the establishment of healthy lifestyle behaviors, such as a good nutrition and adequate physical activity.



Heart Attack
These warning signs indicate that a heart attack may be happening and immediate medical attention is needed.

The warning signs of heart attack:

- ▶ Pressure, fullness, squeezing, or aching in the chest area
- ▶ Discomfort spreading to the arms, neck, jaw, upper abdomen, and back
- ▶ Chest discomfort with shortness of breath, lightheadedness, sweating, nausea, and vomiting

Ⓢ In many cases sudden cardiac arrest can be reversed if CPR or electric shock using a defibrillator is applied. **Why is it important to have defibrillators available in many different public places?**



Start a Healthy Habit

Working prevention strategies into your everyday life is the best way to reduce your risk of cardiovascular diseases. Take the quiz, and then complete the activity.

What You'll Need

- pen or pencil
- paper

What You'll Do

Number a sheet of paper from 1 to 10. Read each statement and write "always," "most of the time," "once in a while," or "never" for each item.

1. I avoid tobacco products and secondhand smoke.
2. I get 60 minutes of physical activity five or more days per week.
3. I get at least 30 minutes of moderate or 20 minutes of vigorous aerobic exercise at least three times a week.
4. I eat plenty of fruits, vegetables, and whole-grain foods.

5. I limit foods that are high in fat and cholesterol.

6. I limit my intake of salt and sodium.

7. I choose nutritious snacks.

8. I maintain a healthful weight.

9. I practice anger-management skills.

10. I practice stress-management skills.

Choose two habits you need to improve. In small groups, brainstorm a list of specific actions to help you practice these habits. Develop strategies to incorporate at least three healthy habits into your routine. Write a paragraph in which you describe your plan. After two weeks, evaluate what obstacles you faced, and what you are doing to improve.

Apply and Conclude

As a group, report on your successes in improving your lifestyle behaviors. Explain why the behaviors are healthful.

Stroke

When arterial blockage interrupts the flow of blood to the brain, a stroke may occur. Stroke can affect different parts of the body, depending on the part of the brain that is deprived of oxygen. Stroke also can occur as a result of a *cerebral hemorrhage*, a condition in which a blood vessel in the brain bursts, causing blood to spread into surrounding brain tissue.

Why Teens Are at Risk

The behaviors established during your teen years and early adult life determine, in large part, your risk of developing CVD. Even though the symptoms of CVD often don't show up until

adulthood, the disease itself starts to develop in childhood, according to the American Heart Association. Autopsy results of adolescents who died from causes other than CVD have revealed that one in six already had evidence of CVD. Those who had a history of known risk factors, such as smoking or diabetes, were more likely to have blood-vessel damage. The health behaviors you practice *now* are affecting your cardiovascular system.

Risk Factors for Cardiovascular Disease

The American Heart Association has identified several factors, such as those in **Figure 26.2**, that increase the risk of cardiovascular disease. The more risk factors you have, the greater your chance of developing cardiovascular disease.

FIGURE 26.2

RISK FACTORS FOR CVDs YOU CAN CONTROL

Although you cannot control all risk factors, the ones listed below are the result of the daily decisions you make about your health and health habits.

Tobacco Use	<ul style="list-style-type: none"> • Avoid the use of tobacco. About 20 percent of the deaths from cardiovascular disease are smoking-related. Tobacco use is the biggest risk factor for teens. • Avoid secondhand smoke. Constant exposure to other people's smoke increases the risk of cardiovascular disease even for nonsmokers. About 40,000 non-smokers exposed to environmental tobacco smoke die from CVDs each year.
High Blood Pressure	<ul style="list-style-type: none"> • Have your blood pressure checked periodically. Maintain normal blood pressure through a healthful diet, regular exercise, and proper weight. If your blood pressure is above normal, follow the advice of your physician to lower it.
High Cholesterol	<ul style="list-style-type: none"> • Eat less high-fat foods. High blood cholesterol can usually be controlled with medication and by practicing healthful lifestyle behaviors. Eat a diet low in cholesterol and saturated fats, and get regular physical activity. These behaviors help keep plaque from forming in your arteries.
Physical Inactivity	<ul style="list-style-type: none"> • Get enough physical activity. Physical inactivity can be a risk factor even if you aren't overweight. Get at least 30 to 60 minutes of physical activity each day. Regular physical activity strengthens your heart and helps you maintain a healthy weight.
Excess Weight	<ul style="list-style-type: none"> • Maintain a healthy weight. Excess weight increases the strain on the heart. It also raises blood pressure and the levels of blood cholesterol.
Stress	<ul style="list-style-type: none"> • Reduce stress. Constant stress can raise blood pressure. Practice stress-management techniques.
Drug and Alcohol Use	<ul style="list-style-type: none"> • Avoid the use of alcohol and other drugs. Drinking too much alcohol can raise blood pressure and cause heart failure or irregular heart beat. Some illegal drugs increase the heart rate and blood pressure and can result in sudden death from heart failure.

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heredity To learn more about heredity and genetics, see Chapter 19, page 498.

RISK FACTORS THAT CANNOT BE CONTROLLED

Some risk factors for cardiovascular disease are out of your control, but you should be aware of them and know how they affect your health. These factors include:

- ▶ **Heredity.** Children whose parents have cardiovascular disease are more likely to develop CVD themselves.
- ▶ **Gender.** Men have a greater risk of developing cardiovascular disease earlier in life and a greater risk of having a heart attack than women do. However, research indicates that older women are less likely to survive a heart attack than men of the same age.
- ▶ **Age.** As people become older, they become more likely to develop CVD, as the risk increases with age. About 80 percent of people who die of cardiovascular disease are 65 or older.

Knowing the risk factors you can't control can help you make healthful decisions that protect your cardiovascular system. For example, if you have a family history of hypertension, you should be particularly careful to get the proper medical screenings and to practice preventive strategies, such as maintaining a healthful weight.

Lesson 1 Review

Reviewing Facts and Vocabulary

1. What is *atherosclerosis*? How does it contribute to heart attacks?
2. Define *cardiovascular disease*. How does regular physical activity help prevent CVD?
3. What are five risk factors for CVD that you can control?

Thinking Critically

4. **Evaluating.** Which of the treatments in Figure 26.1 would most likely be used to treat atherosclerosis?
5. **Synthesizing.** How can practicing healthy lifestyle behaviors now help you avoid cardiovascular disease in the future?

Applying Health Skills

Practicing Healthful Behaviors. On a sheet of paper, design a table that lists five of your favorite snacks, and find out which ones are "heart-healthy." For each of the others, think of healthier alternatives that you would enjoy. Enter the alternatives in your table.

TECHNOLOGY OPTION

SPREADSHEETS Using spreadsheet software to create your table will help you organize and display your thoughts. See health.glencoe.com for tips on how to get the most out of your spreadsheet program.

Activity 95**Guided Reading Activity**

FOR USE WITH CHAPTER 26, LESSON 1

Directions: Briefly answer the following questions in the space provided.

1. Name four types of cardiovascular disease. *4pts*

2. List four ways you can reduce your risk of cardiovascular disease. *4pts*

3. Why is hypertension a problem for the human body? *1pts*

4. Why is hypertension considered a "silent killer"? *1pt*

5. Name three factors that can damage the inner lining of the arteries. *3pts*

6. Explain how atherosclerosis can contribute to a heart attack or a stroke. *2pts*

7. What is angina pectoris? *1pt.*

8. Do all arrhythmias indicate the presence of cardiovascular disease? Explain your answer. *1pt.*

9. What is a heart attack? *1pt.*

10. Why do heart attack victims often wait too long before getting help? *1pt.*

11. What is congestive heart failure? *1pt*

12. List four factors that can result in congestive heart failure. *4pts*

Guided Reading, Activity 95 (Continued)

FOR USE WITH CHAPTER 26, LESSON 1

Name _____
Class _____
Date _____

13. Name two conditions that may result in a stroke. *2pts*

14. What determines what part of the body will be affected by a stroke? *1pt*

15. Explain why teens should be concerned about risk factors for cardiovascular disease when symptoms usually show up in people who are much older. *1pt*

16. In the first column, list four risk factors for cardiovascular diseases that you can control. In the second column, describe a behavior that would reduce each risk. *8pts*

Risk factors for CVDs you can control	Recommended behavior
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17. List three risk factors for CVDs that you cannot control. *3pts*

18. Explain why it is important to understand the risk factors that you can't control. *1pt*