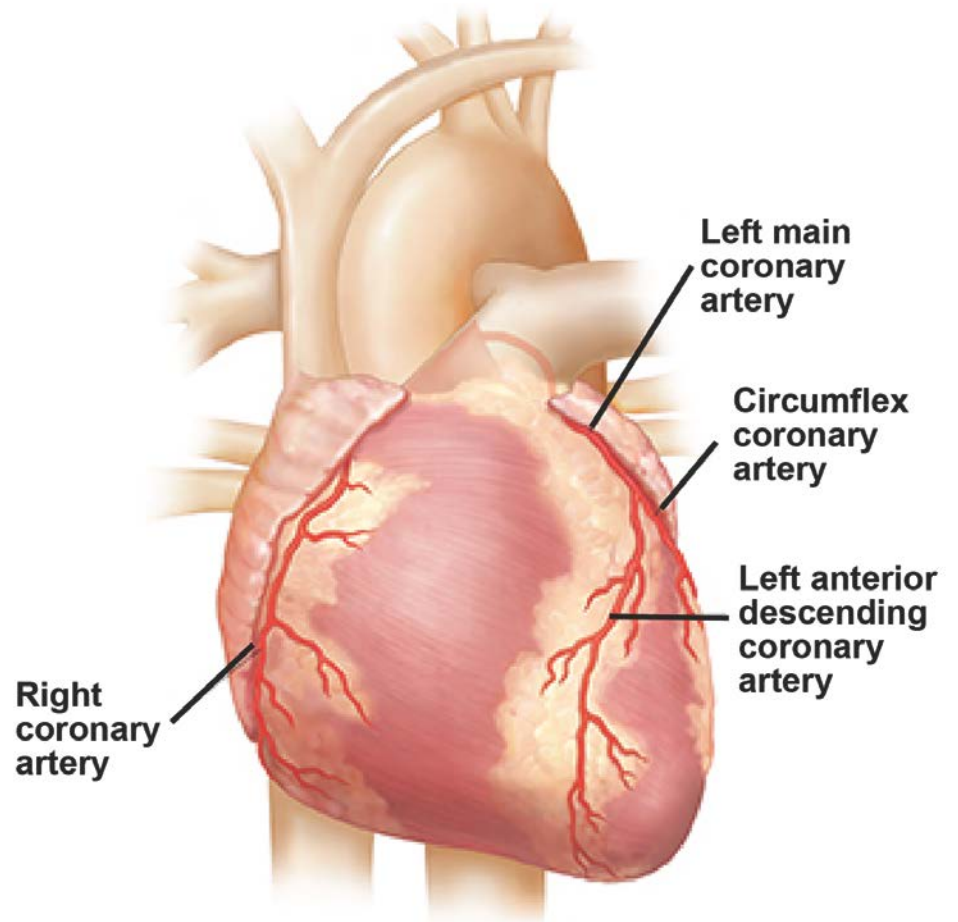


## **The Heart and Heart Disease**

*How the heart works and what happens when arteries are blocked*

*This handout explains heart disease. It describes the structure and function of the heart, types of heart disease, risk factors for heart disease, and what happens during a heart attack.*

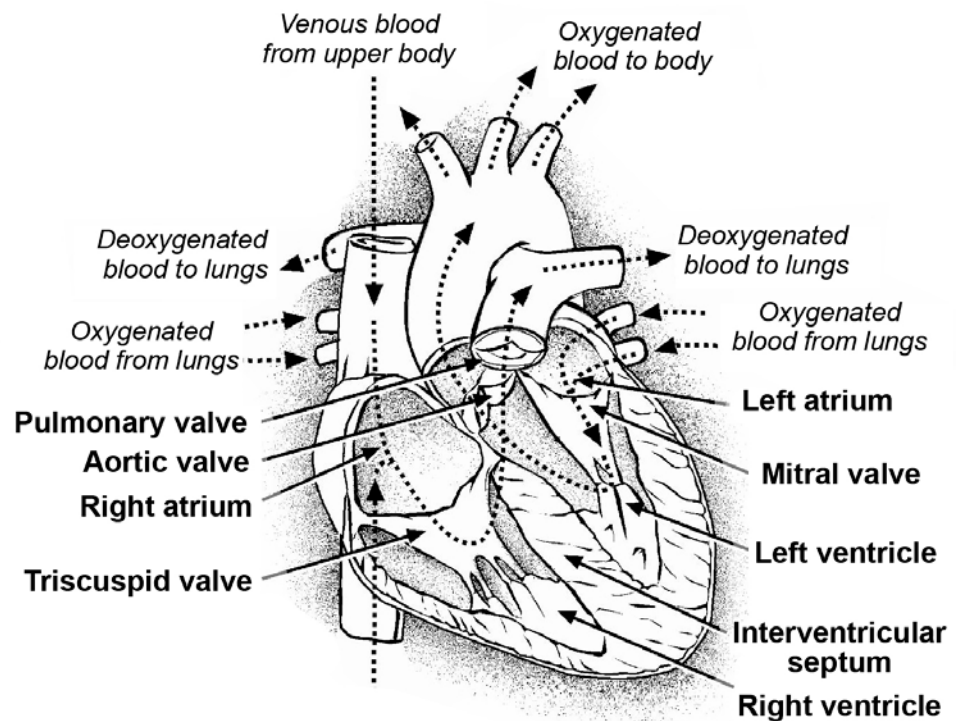


## The Heart and How It Works

The heart is a muscle. It lies a little to the left of center in your chest. It is protected by the *sternum* (breastbone) and rib cage.

The heart's job is to pump oxygen-rich blood from the lungs and send it to all parts of the body. It pumps about 5 quarts of blood each minute.

The heart has 4 chambers that are each about the size of a fist. The 2 chambers on top are called the *atria*. This is where the blood collects. The lower chambers are called the *ventricles*. Blood is pumped out of these chambers. The heart has 4 one-way valves that keep blood flowing in the right direction.



*Text in italics shows how blood flows through the heart.*

The heart muscle needs oxygen and nutrients to work well. It receives nourishment from a system of arteries called the *coronary arteries*. They branch and divide so that the entire heart is provided with oxygen-rich blood.

Heart disease, or *coronary artery disease* (CAD), occurs when the coronary arteries become blocked. This can cause *angina* (chest discomfort) or heart attacks.

## About Coronary Artery Disease

Coronary artery disease is also called *coronary atherosclerosis* or *ischemic heart disease*. In these conditions, changes occur in the heart arteries that restrict oxygen supply to the heart muscle. This is a slowly *progressive* disease (it gets worse over time).

As the disease gets worse, the inner layer of the artery becomes thick and irregular. Cholesterol and calcium start to build up on the artery wall. This buildup is called *plaque*. As plaque builds, the artery narrows. This blocks the normal blood flow.

A spasm in the wall of the artery may also cause the blood vessel to narrow.

When a coronary artery is blocked from either a spasm or plaque, it can cause *ischemia*. This is a short-term decrease in the supply of oxygen-rich blood to part of the heart muscle.

### Angina

The most common symptom of coronary artery disease is *angina pectoris*. This discomfort is often felt in the chest. It can also occur in the neck, arms, back, or jaw. Angina is often described as “pressure” or “tightness.” It can vary from a mild ache to a severe crushing feeling. It may go away and come back many times.

Angina can occur during exercise, from being out in the cold, after a heavy meal, with emotional stress, or when you are overly tired. At these times, the heart muscle needs more oxygen than the partly blocked coronary artery can supply.

Most times, angina lasts only a few minutes. It is often eased by resting or by taking *nitroglycerin*. This medicine quickly expands the coronary arteries and increases the blood supply to the heart.

There are 2 types of angina:

- *Stable angina* is chest pain that occurs when you are physically active or under or emotional stress. This type of angina goes away when you rest.
- *Unstable angina* is chest pain that occurs when you are at rest. It lasts longer than a few minutes. Over time, it may start to occur more often, and when you do not expect it.

### Heart Attacks

A heart attack occurs when the blood supply to the heart is suddenly blocked. This causes damage to the heart muscle. A heart attack is also called *acute coronary syndrome*.

*Coronary atherosclerosis* is linked with heart attacks. Atherosclerosis is a disease in which *plaque* (deposits of cholesterol and other fatty substances)

begins to line the inner walls of arteries. Sometimes, this plaque bursts and causes a blood clot to form. The clot stops blood flow, which causes a heart attack.

When you have a heart attack, part of your heart muscle dies because the supply of blood and oxygen is stopped or greatly reduced. The heart muscle surrounding the area may be injured, too. After a heart attack, your heart may not be able to pump as well. The more heart damage there is, the more your heart loses its ability to work.

As the damaged part of your heart heals, scar tissue forms in the area. The healing process takes about 4 to 6 weeks, but it will depend on the extent of heart injury and how fast you heal. Some people may need *angioplasty* or *coronary stents* to help restore blood flow to certain areas of the heart. (See page 6 to learn about these treatments.)

In the hospital, we will restrict your activity for the first few days after your heart attack. After that, you must limit your activity until your heart has time to heal. After a heart attack, most people can resume their normal activities within a few weeks to months.

## Symptoms

A heart attack can occur suddenly, and at any time or place. Most people do feel symptoms, but you can have a heart attack and not have any symptoms.

If you have a heart attack, you may:

- Feel pain or discomfort in your chest, jaw, shoulders, arms, or upper abdomen
- Sweat
- Be short of breath
- Have nausea
- Be lightheaded

These symptoms can be quite severe for some people. For others, the symptoms may be mild or come and go.

- **Women:** It is common for women to have chest pain or discomfort when they have a heart attack. But, women are a little more likely to feel short of breath, have nausea and vomiting, and have back or jaw pain.
- **Older adults:** Your heart attack symptoms may include fainting, weakness, or confusion. Do not ignore these symptoms. Get them checked right away to avoid serious illness or death.

## What to Do

Early treatment can increase the chances of surviving a heart attack. It can also help to prevent too much damage to the heart muscle. About 30% of people (30 out of 100 people) who have heart attacks die before they reach the hospital because they waited too long to call for help.

- If you have any heart attack symptoms, **get help right away**. Getting help quickly can mean the difference between life and death.
- If you think someone else is having a heart attack, **call 911 right away**. Do **not** take the time to drive the person to the emergency room.
  - The 911 dispatcher may tell you to give the person aspirin while waiting for help to arrive. If the dispatcher does not tell you to do this, do **not** give the person aspirin. Aspirin can be harmful in some heart attacks.

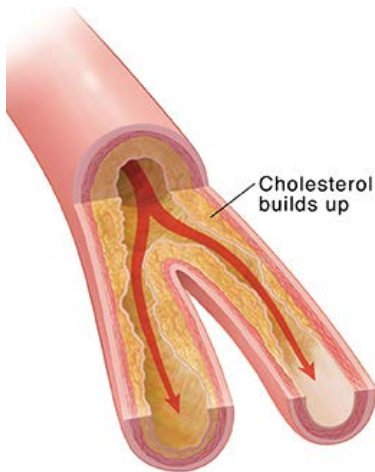
## After a Heart Attack

If you have already had a heart attack, you are at risk for having another. Your provider may prescribe a medicine such as nitroglycerine for you to take if you have chest pain.

Remember to take all medicines exactly as your provider prescribes. Do **not** stop taking them without talking with your provider first.

## If You Have Diabetes

Over time, high blood sugar can damage the nerves in your body. This may keep you from feeling pain, leading to a “silent” heart problem. If you cannot feel symptoms, you may not realize that you are having a heart attack. Talk with your provider about how to lower your risk for silent heart problems.



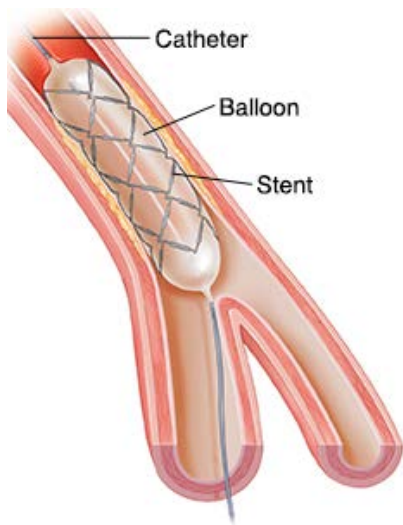
*Cholesterol can build up in your arteries and limit blood flow.*

## If You Have High Cholesterol

Cholesterol is a fatty substance that builds up in your bloodstream. It combines with other substances to form plaque. Too much plaque narrows your arteries and limits blood flow.

High cholesterol can cause any artery in your body to become narrow. When you have high cholesterol, you have a higher risk for heart attack (*acute myocardial infarction*), heart disease, or stroke.

If your cholesterol is high, you can take steps to bring it down. Eating the right foods and getting enough exercise can help. Some people also need medicine to control their cholesterol. Talk with your provider about a plan to control your cholesterol.



A stent may be placed to hold open an artery that has narrowed.

## Treatments for Heart Disease

Treatments for heart disease often involve:

- *Angioplasty*, a procedure to restore blood flow through an artery
- *Stenting*, a process for placing a device in a narrowed artery to keep it open

A heart doctor called an *interventional cardiologist* does both angioplasty and stenting. This doctor has special training in safely doing these procedures.

### Coronary Stents

A *stent* is a small metal coil or mesh tube. It is placed in a narrowed artery to hold it open (see drawing at left). This helps improve blood flow to your heart. A stent also helps keep the artery from getting narrow again after treatment (*restenosis*).

Some stents slowly release medicine over time. This reduces the amount of scar tissue that forms inside the artery. This helps prevent restenosis.

### Notes and Questions

Use this space to write notes or questions you have for your provider. Take this page with you to your next clinic visit.

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#### Questions?

Your questions are important. Call your doctor or healthcare provider if you have questions or concerns.

**Heart Institute at UWMC:**  
Weekdays from 8:30 a.m. to 5 p.m., call 206.598.4300 and press 2 when you hear the recording.

After hours or weekends or holidays, call 206.598.6190 and ask to page the Cardiologist on call.