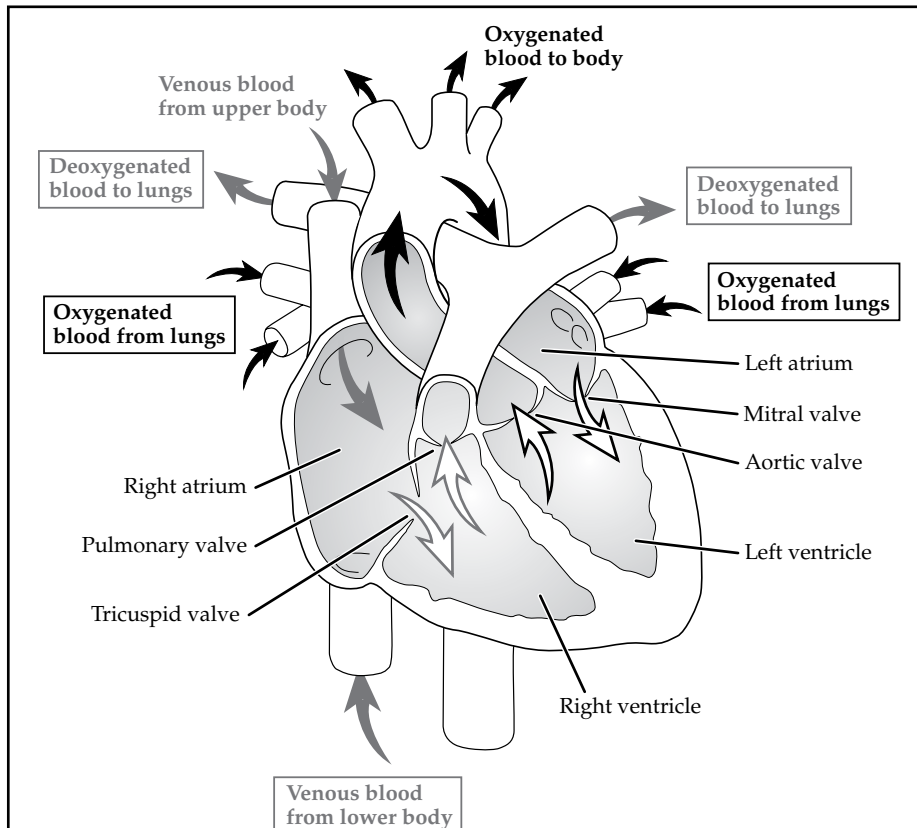


# Chapter 1: Your Heart and Heart Failure

Many people who have been in the hospital for heart problems want to learn more about how their heart works and what went wrong. Please ask your health care team about anything that you don't understand or if you want to receive more information about something.

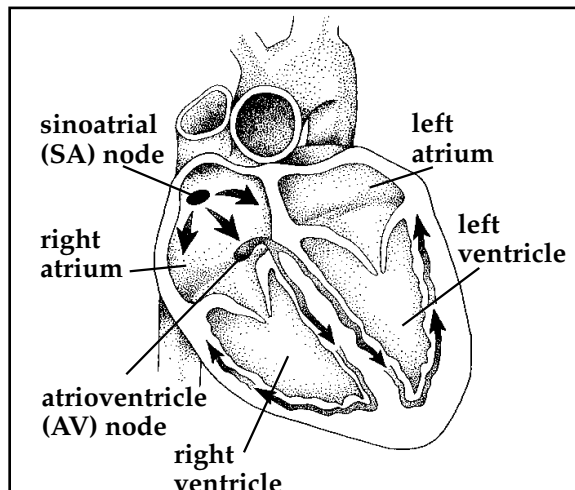
## How Your Heart Works



Illustrations © Allina Health System

**(Top)** Your heart is a muscle that has an electrical system and two chambers, through which blood flows. It is about the size of an adult fist and weighs about 1 pound.

**(Right)** Nodes make your heart beat. The ventricles pump blood to your body and lungs.



Your heart is a muscle. Its main “job” is to pump blood rich in oxygen and nutrients through blood vessels in your body. All cells in your body need oxygen to survive.

Each side of your heart has two chambers: an upper one (called an atrium) and a lower one (called a ventricle).

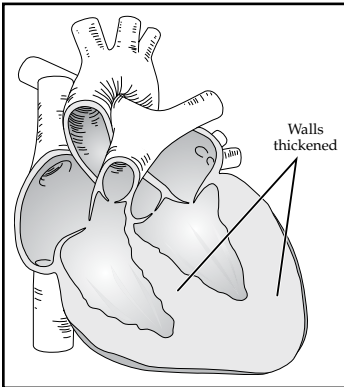
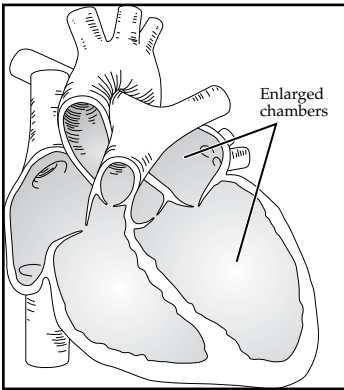
Between each chamber are valves that keep your blood moving in the right direction.

Two blood vessels and their branches, called coronary arteries, supply blood to your heart. These arteries are on the outside of your heart.

Your heart also has an electrical system. This powers your heart's pumping system. A group of special cells sends an electrical impulse through your heart muscle causing it to contract, or beat, about 60 to 100 times per minute.

These special cells are called the sinoatrial (SA) node and the atrioventricular (AV) node.

# Heart Failure



Illustrations © Allina Health System

**Heart failure can be caused by enlarged chambers (top) or thickened walls (bottom).**

Heart failure doesn't mean your heart has stopped working or is about to stop working. It also doesn't mean that you have had a heart attack.

Heart failure means your heart isn't pumping blood as well as it should. Because your heart isn't able to pump the normal amount of blood out of your ventricles, the blood vessels leading into your heart can become congested or "backed up" with blood.

Your heart may be damaged and pump with less force. To try to keep the same amount of blood moving through your body, the chambers stretch to hold more blood. This is known as heart enlargement. Your heart muscle begins to weaken as it tries to pump this increased blood.

Because your heart is weakened, it pumps less blood to your organs, especially to your kidneys, which normally help your body remove extra fluid.

Parts of your body can hold extra fluid that isn't being moved very well by your heart. Your body becomes congested with fluid. This is why heart failure is sometimes called "congestive heart failure."

## Types of Heart Failure

There are two types of heart failure: left-sided and right-sided. The medicine your doctor prescribes will be specific for your type of heart failure.

### Left-sided

- When the left ventricle isn't as strong as it should be, it works harder to pump the same amount of blood.
- There are two types of left-sided heart failure:
  - The left ventricle loses its ability to squeeze (contract) normally. The heart doesn't have enough force to pump blood through the body.
  - The left ventricle can't "relax" because the heart muscle is stiff. The heart can't fill up with blood and there is less blood to pump through the body.
- You feel short of breath if fluid backs up in your lungs.

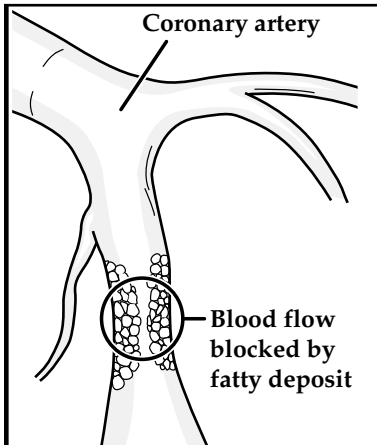
## ❑ Right-sided

- When the right ventricle doesn't pump blood to the lungs like it should, less oxygen is in the blood. As a result, the blood backs up into the veins.
- You have swelling in your feet, legs and abdomen if the fluid backs up.

## Causes of Heart Failure

### Tip

Tobacco use is a risk for coronary artery disease. Read Chapter 6 to learn more.



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**A blocked artery can cause angina (pain) or a heart attack.**

## ■ Coronary artery disease

When plaque (fatty deposits) builds up on the inside of your heart's arteries, it reduces the amount of blood and oxygen your heart receives. As a result, your heart muscle may become damaged. Your heart becomes weak and less blood gets pumped to the rest of your body.

## ■ Heart attack

When an artery to the heart becomes completely blocked, the part of the heart muscle that receives blood from that artery dies. This is called a heart attack (myocardial infarction). It can feel like a crushing type of pain and usually lasts longer than angina (general chest pain).

A heart attack leaves your heart permanently damaged or scarred. This means the undamaged part of your heart has to work harder.

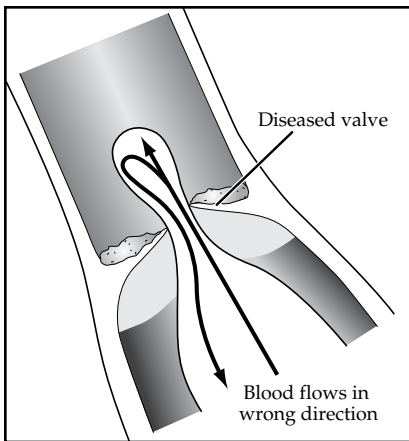
### Call 911 right away if you have:

- chest pain or pressure
- pain moving to your arm, neck, jaw, back or abdomen
- unexplained nausea, heartburn or both
- shortness of breath.

## ■ High blood pressure

When the amount of pressure inside your arteries is high, your heart has to pump with more force to push the blood through the blood vessels. If high blood pressure (hypertension) is not treated, your heart muscle becomes larger and its pumping ability weakens.

High blood pressure usually has no signs. Your blood pressure is checked with two numbers. The top (systolic) shows the pressure in your arteries when your heart beats. The bottom (diastolic) shows the pressure in your arteries when your heart rests.



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**When a valve is diseased, blood can flow in the wrong direction. This causes blood to pool.**

You have high blood pressure if you usually have a top number of 130 or higher or a bottom number of 80 or higher.

### ■ Valve disease

When one or more of your heart valves no longer opens or closes right, blood can flow in the wrong direction. This is called regurgitation.

If the opening of the valve is narrow or smaller than usual, your heart has to work harder to pump blood through it. This is called valve stenosis. Your heart becomes thickened or enlarged. It will lose the ability to pump well.

### ■ Idiopathic cardiomyopathy

When your heart becomes weak and loses its ability to pump with force, you will have heart failure symptoms. "Cardiomyopathy" is a term for a weak heart muscle. "Idiopathic" means without a known cause.

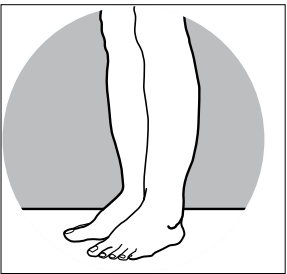
Other causes of heart failure include:

- **pregnancy:** You may develop high blood pressure during pregnancy. This is called preeclampsia. If you had high blood pressure before your pregnancy, the condition may become worse.
- **birth defect:** Part of your heart may not have developed correctly. This is known as congenital heart disease.
- **infection:** Your valves, heart muscle or both may be damaged by a viral or bacterial infection.
- **lung disease or diabetes:** Both of these diseases put extra strain on your heart. The extra work can cause your heart muscle to weaken.
- **alcohol, illegal drugs, chemotherapy or other toxins:** These can damage the heart muscle.
- **morbid obesity:** Being more than 100 pounds overweight puts more strain on your heart.

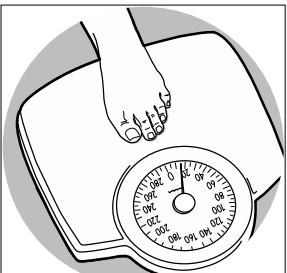
# Symptoms of Heart Failure



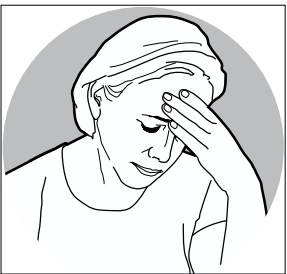
**Problems breathing and waking up breathless at night.**



**Swelling in your feet, ankles, legs, hands, lower back, abdomen.**



**Weight gain.**



**Feeling very tired, dizzy or lightheaded.**

Symptoms of heart failure may develop slowly over days or weeks. They may also develop quickly. Get help as soon as you have symptoms. If you do not, you may need to stay in the hospital to get the symptoms under control.

Common symptoms are:

- **difficulty breathing.** This is caused by fluid build-up in your lungs. You may feel like you can't get enough air. You are often short of breath or out of breath when you are active.
- **waking up breathless at night** with or without a dry, hacking cough that may get worse when you lie down. This is caused by the fluid build-up in your lungs. You may need extra pillows so you can breathe easier when you lie down.
- **swelling in your feet, ankles, legs, hands, lower back or all (edema).** This is caused by extra fluid in your tissues. Swelling can be worse at the end of the day or if you have been standing or sitting for a long time.

Check for swelling by pressing on your ankle or foot with your finger. If you leave an indented fingerprint, it is a sign of edema. Call your health care team.

- **swelling in your abdomen (ascites).** This is caused by fluid build-up in the tissue of your abdomen. Swelling (or bloating) in your abdomen may lead to nausea, pain, loss of appetite and shortness of breath.
- **weight gain, even with a loss of appetite.** This is caused by the build-up of fluid in your body. Retaining fluid can make your breathing more difficult or increase swelling.
- **extreme fatigue (tiredness).** This is caused by the lack of oxygen-rich blood to your muscles. As a result, your heart is overworked and you feel tired.
- **dizziness, lightheadedness and lack of concentration.** This is caused by your brain not getting enough blood. It is important to tell your health care team if you are dizzy, lightheaded or if you cannot concentrate.

These may be signs of low blood pressure, an irregular heartbeat or side effects of medicine. Be sure to get up slowly out of a bed or chair.

- **palpitations.** This is the sensation caused by irregular heartbeats. It may be dangerous.

You can manage heart failure symptoms. The earlier you recognize your symptoms and report them to your health care provider, the less time you may need to spend in the hospital. This means your life will be more enjoyable.

**Remember, if you have any symptoms that keep coming back and call your health care provider right away. You may be able to keep yourself out of the hospital.**

## Special Tests

- **Echocardiogram.** This test shows how well your heart is pumping. It also shows if your heart is enlarged, if there are any valve problems, or how thick your heart walls are.

This test shows your heart on a computer screen. Ultrasound waves bounce off your heart and create a picture on the screen.

- **Electrocardiogram.** This test records the electrical impulses that travel through your heart. It shows the rhythm and rate of your heartbeat.

The test is known as an ECG or EKG. You will have small pads (electrodes) placed on your chest, arms and legs. These pads are connected to some cables, which are connected to the ECG machine.

- **X-ray.** This test takes pictures of your heart and lungs. These pictures show the size and shape of your heart. X-rays can also show if there is fluid in your lungs.
- **Lab tests.** These tests are done by testing small amounts of blood, urine or both. The results can show how well your kidneys or other organs are working. You may have your cholesterol or blood glucose levels checked. Another test can check the levels of a hormone (BNP) that is made and released when your heart is overworked or stressed.
- **Stress test.** This test measures how hard your heart works during activity. The test may be done while you walk on a treadmill or ride a stationary bike. Or, you may also be given a medicine that stresses your heart. You may also have an echocardiogram or other imaging tests done before and after the stress test. These tests show how your heart is responding.
- **Cardiac MRI (magnetic resonance imaging).** This test uses a large magnet, radio waves and a computer to show a special image of your heart.



- **Holter monitor.** This test can find an abnormal heart rate or rhythm. You wear a portable monitor connected to your chest with patches. The monitor records changes in your heart's rhythm over several hours or days.
- **Cardiac catheterization.** This test can help find clogged blood vessels. It can find heart problems with pumping, heart chambers, blood flow or valves.

X-ray dye is injected into your heart through a thin tube called a catheter. A special X-ray (angiogram) is taken of the blood vessels in your heart. This test can be done to measure the pressure on the right side of your heart and lungs.

## How To Manage Heart Failure

### Important

**It is important to weigh yourself every day and write down your weight.**

- Weigh yourself every morning after you urinate and before you eat or drink anything.
- Use the same scale.
- Weigh yourself without clothes.

**Call your health care provider if you gain:**

- 3 pounds in 1 day  
or
- 5 pounds in 1 week.

It is important to learn the symptoms of worsening heart failure and call your health care provider right away. This will affect how you feel and how well you manage your heart failure.

Use the following tips to help you feel better and manage your heart failure.

- Keep all appointments with your health care provider and health team members.
- Take your medicines as directed.
- Carry a current medicine list with you at all times.
- Weigh yourself each day and record your weight.
- Follow a well-balanced diet that includes 1,500 to 2,000 milligrams (mg) of sodium each day.
- Maintain a healthy weight. Talk with your health care provider if you are overweight or underweight.
- Bring this book and your weight and activity records to all of your appointments.
- Exercise every day (as directed by your health care team) and be sure to get enough rest.
- Do not smoke. Avoid secondhand smoke.
- Be aware of the stress in your life and try to find ways to relieve it.

## When To Call Your Health Care Provider

Call your health care provider if you:

- gain 3 pounds in 1 day
- gain 5 pounds in 1 week
- have swelling in your ankles, legs and abdomen
- have increased fatigue
- have increased shortness of breath on exertion, shortness of breath at night or when lying flat
- have an unexplained cough or a “hacking” night cough
- cough up pink- or blood-tinged phlegm
- have decreased urination during the day, but feel the need to urinate more often at night
- need to sleep with more pillows at night
- feel lightheaded or dizzy
- have nausea or cannot eat, take medicines or both
- have chest pain or discomfort with activity that gets better with rest.

## When To Call 911

Call 911 if you:

- pass out or faint
- become extremely short of breath or are unable to talk due to being breathless
- have severe chest pain that is not helped by nitroglycerin
- have a rapid, racing heartbeat that doesn't slow down.



## Managing Your Reaction to Heart Failure

Heart failure involves your whole family. Everyone will be affected by this condition. Fear, guilt and anger are all possible emotions that need attention. These are normal feelings, but dealing with them can be a struggle.

You may fear loss of control and changes in family roles, or you may have financial worries.

Guilt is a common reaction, especially for your spouse or partner. “Why didn’t I insist that he or she exercise every day?” “Why didn’t I insist on more healthy eating?”

Anger is also a common family reaction. “Why dad?” “Why mom?” “He’s too young for this!” Anger is often an emotion that comes from fear of the unknown.

It is important to have support for your emotions. Your nurses, doctors, chaplain, social worker and cardiac support groups are important resources. They will help you and your family.

