CHRONIC KIDNEY DISEASE

Working together to improve your health

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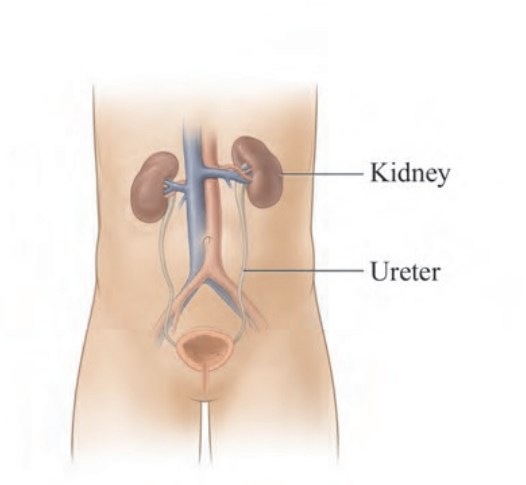
Kidney Disease: How the Kidneys Work



Your kidneys are two bean-shaped organs. Each one is about the size of your fist. They are located in your belly behind your stomach, one on either side of your spine.

You may already know that your kidneys produce urine. But you may not know how many other important jobs they do.

Understanding more about how your kidneys work and how kidney disease develops may help you take steps to keep your kidneys healthy.

What do your kidneys do?

Your kidneys perform several important functions.

- **They remove wastes.** The kidneys filter waste products and excess fluid out of the blood. These wastes are then removed from the body in the form of urine. Waste products and excess fluid are produced by the normal breakdown of food and the chemical reactions that occur in cells throughout the body (metabolism). Filtering waste products is the most important function of the kidneys.
- **They regulate the balance of chemicals in your body.** Your kidneys maintain the proper balance of chemicals, such as sodium, potassium, calcium, and magnesium, that your body needs to work properly. The kidneys remove excess amounts of these chemicals from the blood and flush them from the body as urine.
- **They produce hormones.** Your kidneys produce three important hormones. These hormones help your body make red blood cells, help regulate blood pressure, and help your body absorb calcium from food to build healthy bones and keep your muscles working normally.

Will you know if you have kidney problems?

You may not know you have kidney problems. Most people do not have symptoms early on. Chronic kidney disease often seems to come on suddenly, but usually it has been developing for many years.

Each of your kidneys has about a million tiny filters, called nephrons. When some of the nephrons are damaged and stop working, the healthy ones take over their work. If the damage continues, more and more nephrons shut down. After a certain point, the kidneys become unable to do their job.

Kidney disease runs in families. If you have kidney disease, encourage close family members to have their kidneys tested.

If kidney disease is found early, treatment can be started to slow or stop the damage.

What are the symptoms of chronic kidney disease?

Some people start to have symptoms only a few months after their kidneys begin to fail. But many do not have symptoms for as long as 30 years or more. This is called the "silent phase" of the disease.

As kidney damage gets worse, you may:

- Urinate less than normal.
- Have swelling and weight gain from fluid buildup in your tissues (edema).
- Feel very tired.
- Lose your appetite or have an unexpected weight loss.
- Feel nauseated or vomit.
- Be either very sleepy or unable to sleep.
- Have headaches or trouble thinking clearly.
- Have a metallic taste in your mouth.
- Have severe itching.

You may be able to keep kidney damage from getting worse by taking medicines and making lifestyle changes. For the best results, you will need to partner with your doctor and carefully follow all treatment steps.

Kidney Disease: The Stages of Chronic Kidney Disease

Chronic kidney disease is divided into five stages based on how well the kidneys are working. To find the stage of your kidney disease, your doctor will measure how well your kidneys are filtering your blood. This is called glomerular filtration rate, or GFR. To find your GFR, your doctor uses your test results as well as your size, age, race, and sex.

Your doctor may give you a yearly creatinine test to estimate your GFR. Creatinine is a chemical that builds up in your blood when your kidneys are not working well.

What can you do to slow kidney disease?

At all stages of chronic kidney disease, you can take steps that may help slow or stop kidney damage and help keep you healthy:

- Follow an eating plan that is good for your kidneys. A dietitian can help you make an eating plan with the right amounts of sodium, fluids, and protein.
- Get some exercise every day. Work with your doctor to design an exercise program that is right for you.
- Take your medicines as prescribed. Avoid medicines that can damage the kidneys, such as nonsteroidal anti-inflammatory drugs (NSAIDs). NSAIDs include ibuprofen and naproxen.
- Do not let yourself get dehydrated. Get treatment right away for diarrhea, vomiting, or fever. Be careful when you exercise or during hot weather.
- Do not smoke or use other tobacco products.
- Do not drink alcohol or use illegal drugs.
- Talk to your doctor about controlling your blood pressure.
- Control your blood sugar if you have diabetes.
- Talk to your doctor about lowering your risk for heart disease.

When should you see a kidney specialist?

Your doctor may refer you to a kidney specialist, or nephrologist, as your kidney function gets worse (GFR below 60 if you have diabetes, or GFR below 30 if you do not have diabetes). A nephrologist can treat kidney disease and other conditions that may be causing it.

A nephrologist will take over most of your care if you need dialysis or a kidney transplant.

What are the stages?

The stage of your kidney disease is based on your GFR. The lower the GFR number, the worse the kidney function.

Stages of chronic kidney disease

Stage	Description	GFR	What this means to you
1	Kidney damage with normal or high GFR	90 or above	• Your doctor will try to find the cause of your kidney disease and begin treatment. • Manage other health problems, such as diabetes and high blood pressure. • See your doctor regularly to check your condition.
2	Kidney damage with mildly low GFR	60-89	• Your doctor will estimate how quickly your disease is progressing. • Manage other health problems, such as diabetes and high blood pressure. • Continue to see your doctor for treatment and testing.
3	Moderately low GFR	30-59	• Your doctor will check you for complications, such as anemia and bone disease, and begin treatment if needed. • Continue to see your doctor for treatment and testing.
4	Severely low GFR	15-29	• Decide what type of treatment you want if kidney failure develops. • Continue to see your doctor for treatment and testing.
5	Kidney failure	Below 15	• Start dialysis, have a kidney transplant, or choose comfort care only. • Continue to see your doctor for treatment and testing.

Kidney Disease: Learning How to Cope

Finding out that you have chronic kidney disease can be very difficult. It may have taken you by surprise, since kidney disease usually does not cause symptoms early on.

It is normal to feel upset and afraid. Your diagnosis has a powerful effect on your family, too. They may have a range of emotions, from anger to helplessness.

Learning all you can about your disease and knowing how to get support when you need it can help you cope with your disease.

Understanding the stress of living with chronic kidney disease

Having chronic kidney disease changes your life. Your routine may be turned upside down, and you may be expected to do things that are difficult for you. For example:

- You will need regular medical care to treat your illness. This can be time-consuming. You may need to rely on loved ones to get you to your appointments or to help care for your family.
- You will also need to make a number of lifestyle changes. You will need to carefully follow the recommended diet. This will mean limiting salt, protein, fluids, and minerals. This can be challenging. You may have to give up many foods you like.
- You will probably have to take a number of medicines. It may be hard to remember to take your medicines.
- You may develop kidney failure over time. If this happens, you probably will need dialysis. Dialysis helps your body filter waste when your kidneys are not working well.
- It also may be possible for you to get a kidney transplant. This depends on many factors, like whether there is a good kidney match available.

Making these changes can be stressful. But they are very important. Keeping all your appointments, taking your medicines, and following your diet gives you the best chance of slowing or stopping damage to your kidneys. Work closely with your doctor so you can stay as healthy as possible.

Emotional changes you may face

Learning you have a chronic disease can cause a variety of emotions. You may feel depressed or worried about what the future holds. You may feel a sense of loss. It is important to be honest about your feelings. If you are sad, it is better to cry than to hold it in. Share your feelings with your loved ones, or seek help from a counselor.

You may find that your moods vary widely. It can help to know that this may be part of the disease or its treatment. Having waste products built up in your blood can make you feel irritable. Some medicines can make you feel down. If your mood swings continue, ask your doctor if there are other treatments that might help.

Will you be able to work?

Many people with chronic kidney disease are able to work. You may need to make adjustments to your work duties or schedule. But getting back to a more normal routine can help you feel better. Your doctor can give you a good idea of how soon you will be able to return to work.

Finding support

After learning you have chronic kidney disease, you may feel alone, but you are not. There are many places you can look for support:

- **Your loved ones.** Some people worry about being a burden to their family and friends. But the people who love you want to help. Sharing your feelings and needs may help them deal with their own emotions.
- **Other people who have kidney disease.** Ask your hospital social worker to introduce you to other people who have kidney disease. It can be very helpful to hear how others have dealt with the same problems.
- **Professionals.** Your hospital social worker can help with emotional or family problems or refer you to another type of counselor. Or you may turn to a trusted spiritual adviser.
- **Groups.** There are a number of groups that provide excellent information for people with kidney disease and their families. These include the National Kidney Foundation, American Association of Kidney Patients, National Institute of Diabetes and Digestive and Kidney Diseases, National Kidney and Urologic Diseases Information Clearinghouse, and American Kidney Fund.

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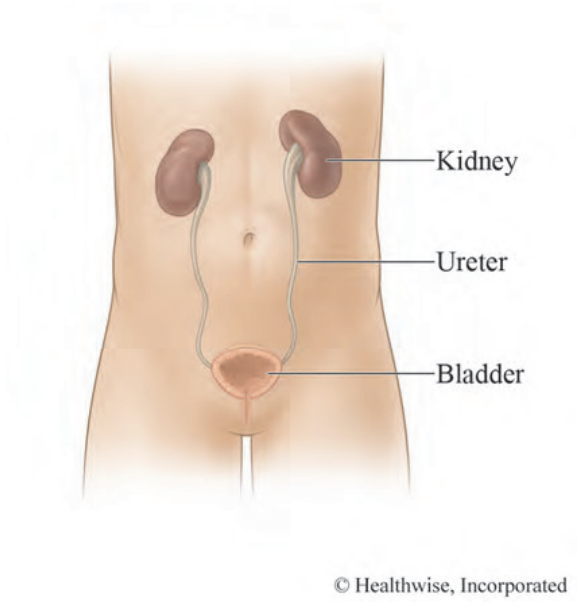
Kidney Disease: Kidney Function Tests



How well your kidneys work is called kidney function. Chronic kidney disease may not cause symptoms until your kidney function has dropped to a very low level. Testing is vital to help your doctor know:

- Whether kidney disease has developed suddenly or as a long-term process.
- What is causing the kidney damage.
- The best type of treatment.
- How well treatment is working.

If you have kidney disease, it is important to have regular tests to check your kidney function. Regular testing may help you slow or stop the progression of the disease.

Tests to monitor kidney function

Urine tests measure how much protein is in the urine. Normally there is little or no protein in urine. Kidney disease can cause increased protein in the urine. Urine tests that may be done include:

- Urinalysis (UA).
- Random or spot urine test for total protein or albumin, a type of protein.
- 24-hour urine test. This involves collecting all urine for 24 hours. This test is done less often than in the past.

Blood tests can measure changing levels of substances in your bloodstream. These test results can help your doctor estimate how well your kidneys are working.

A creatinine test measures the level of a waste product called creatinine in the blood. As kidney disease gets worse, the level of creatinine in the blood rises.

Your doctor or the lab may use the results of your creatinine test to estimate your glomerular filtration rate, or GFR. GFR helps your doctor judge how much kidney function you have left. The stage of your kidney disease is based on your GFR.

You may also have other blood tests to check your fasting blood sugar level, parathyroid hormone (PTH), blood urea nitrogen (BUN), and electrolytes.

Imaging tests provide pictures of your kidneys that can help your doctor understand how well your kidneys are working.

- An ultrasound of the kidneys (renal ultrasound) measures the size of the kidneys. This may help your doctor estimate how long you have had kidney disease. Your doctor can also check whether urine flow from the kidneys is blocked.
- An ultrasound or angiogram of the blood vessels going to the kidneys looks for blocked or narrowed blood vessels. A blocked or narrowed blood vessel reduces blood flow through the kidneys. This can lead to kidney damage and high blood pressure.

How often should you have your kidney function tested?

How often you need to have your kidney function tested depends in part on what other conditions you have. You are more likely to develop chronic kidney disease if you have diabetes, high blood pressure, cardiovascular disease (such as heart attack or stroke), or a family history of kidney disease. If you have any of these conditions but do not yet have kidney disease, your doctor may want to test you every year.

If you have been diagnosed with chronic kidney disease, your doctor will schedule regular visits to check your kidney function. Be sure to keep all your appointments and follow all treatment steps. By partnering with your doctor, you may be able to slow or stop the progression of chronic kidney disease.

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Your Health: Your Risk of Kidney Disease

Anything that increases your chance of having a disease is called a risk factor. Any condition or disease that damages your kidneys can lead to kidney disease. Diabetes and high blood pressure are the leading risk factors for chronic kidney disease.

You cannot change some things that increase your chance of having kidney disease. For example, you have a higher risk of developing kidney disease if you are an older adult or have a family history of kidney disease.

Luckily, you can control other important risk factors, like diabetes and high blood pressure.

Whatever your level of risk, there are steps you can take to lower your chance of having kidney disease.

What are the risk factors for chronic kidney disease?

The biggest risk factors are diabetes and high blood pressure.

- **Diabetes** causes high blood sugar. High blood sugar damages blood vessels in the kidneys.
- **High blood pressure** gradually damages the tiny blood vessels in the kidneys.

Your chance of having chronic kidney disease is also higher if:

- You have a family history of kidney disease.
- You have a kidney disease or infection or a kidney problem you were born with.
- You are of African-American or Native American descent.
- You often take medicines that can damage the kidneys. Examples include NSAIDs such as aspirin or ibuprofen (Advil, Motrin), and certain antibiotics. Illegal drugs can also damage your kidneys.
- You smoke or use other types of tobacco products. Tobacco use can reduce blood flow to the kidneys and increase blood pressure.

How can you lower your risk for chronic kidney disease?

If you have diabetes or high blood pressure, work closely with your doctor, and see a dietitian to learn the best way to eat. You can lower your risk for chronic kidney disease if you can control these conditions.

If you have diabetes, you will need to control your blood sugar levels.

To be successful:

- Follow an eating plan that spreads carbohydrate throughout the day.
- Get regular exercise.
- Check your blood sugar level at home.
- Take your medicine as prescribed.

Controlling your blood pressure can help to prevent damage to your kidneys. Your doctor will give you a blood pressure goal. An example of a goal is to keep blood pressure below 140/90. Your goal may be lower or higher based on your health and age.

To be successful:

- Eat healthy, be active, stay at a healthy weight, and don't smoke.
- Take blood pressure medicine if your doctor prescribes it. It is very important to take these medicines just as your doctor tells you and to keep taking them. Call your doctor if you think you are having a problem with your medicine.

There also are other steps you can take to help your kidneys stay healthy:

- Get some exercise every day. Exercise can help you lower your risk for many diseases, including diabetes and high blood pressure. It can also help you stay at a healthy weight and feel better.
- Avoid medicines that can damage your kidneys. Be sure that your doctor knows about all prescription, over-the-counter, and herbal medicines you are taking.
- Manage your cholesterol. A healthy lifestyle along with medicine can help lower your cholesterol and risk of heart and blood vessel problems.
- Avoid dehydration. Be careful when you exercise or during hot weather. Get treatment right away for illnesses that can cause dehydration, such as diarrhea, vomiting, or fever.
- Do not smoke or use other tobacco products.
- Do not drink large amounts of alcohol or use illegal drugs, which can damage your kidneys.
- Limit how much sodium you have each day.

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Kidney Disease: Controlling Your Blood Pressure

Blood pressure is a measure of the force of blood against the walls of your arteries. If your blood pressure is usually above 140/90, you have high blood pressure, or hypertension. High blood pressure means that the top number is 140 or higher or the bottom number is 90 or higher, or both.

High blood pressure is one of the major causes of chronic kidney disease. Chronic kidney disease can also cause high blood pressure.

No matter which came first—high blood pressure or kidney disease—having high blood pressure gradually damages the tiny blood vessels in the kidneys. If you have high blood pressure, it is very important to lower it.

There are many steps you can take to lower your blood pressure.

By controlling your blood pressure, you have the best chance of slowing or stopping damage to your kidneys.

How high blood pressure causes kidney disease

Blood pressure that is too high damages blood vessels throughout your body. This can cause less blood to get to the kidneys. High blood pressure also damages the tiny filters in your kidneys. Then the kidneys cannot filter your blood properly. Your body will begin to retain fluids, and waste products will build up in your blood. As extra fluid builds up in your blood, your blood pressure can rise even more.

Your kidneys help keep your blood pressure in a normal range. But when they are damaged, they may not be able to do this job. This is why you may have high blood pressure with chronic kidney disease even if you did not have high blood pressure before.

High blood pressure is called a "silent killer." If you have high blood pressure, you may feel fine. But even though your blood pressure is not causing symptoms, it is causing serious damage. This is why it is so important to lower your blood pressure.

Steps to control your blood pressure

There are many steps you can take to control your blood pressure and slow or stop damage to your kidneys:

- **Take your medicines.** You will probably need more than one medicine to lower your blood pressure. If you stop taking your medicine, your blood pressure will go back up. Call your doctor if you think you are having a problem with your medicine.

- **Eat wisely.** Follow an eating plan that is good for your kidneys and also lowers the amount of saturated fat in your diet. Most people who have kidney disease need to limit salt (sodium), fluids, and protein. A dietitian can help you make an eating plan.
- **Stay at a healthy weight.** This is especially important if you put on weight around the waist. Losing even 10 pounds can help you lower your blood pressure.
- **Exercise.** Try to do at least 2½ hours of moderate activity a week. It's fine to be active in blocks of 10 minutes or more throughout your day and week. Walking is a great exercise that most people can do. Being more active can help you lower high blood pressure as well as maintain a healthy weight and improve your cholesterol. Talk to your doctor before you start an exercise program.
- **Avoid or limit alcohol.** Talk to your doctor about whether you can drink any alcohol.

Here are some other steps you can take to improve your kidney health:

- **Manage other health problems.** Manage other problems such as diabetes and high cholesterol. You can help lower your risk for heart disease and blood vessel problems with a healthy lifestyle along with medicines.
- **Follow your treatment plan.** Keep all your appointments for checkups and tests. If you have any trouble with your medicines, talk to your doctor. Make sure your doctor knows all of the medicines, vitamins, herbal products, and supplements you take.
- **Talk to your doctor before you take over-the-counter medicines.** Some decongestants and pain relievers, such as ibuprofen, can raise your blood pressure or damage your kidneys.
- **Avoid tobacco.** Do not smoke or use other tobacco products. If you need help quitting, talk to your doctor about stop-smoking programs and medicines. These can increase your chances of quitting for good.

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Kidney Disease: Controlling Diabetes

Diabetes is one of the major causes of chronic kidney disease. It is also the most common cause of kidney failure.

If you have diabetes, it is very important to keep your blood sugar as close to normal as possible.

There are many steps you can take to control your blood sugar. By controlling your blood sugar, you have the best chance to slow or stop damage to your kidneys.

How diabetes causes kidney disease

When you have diabetes, your body cannot make enough insulin or cannot use it properly. Your body needs insulin to help sugar move from the blood to the cells. Without insulin, your blood sugar gets too high.

High blood sugar damages the tiny blood vessels in the kidneys. When these blood vessels are damaged, the kidneys cannot filter your blood properly. Your body will begin to retain fluids, and waste products will build up in your blood.

Steps to control your diabetes

There are many steps you can take to control your diabetes and slow or stop damage to your kidneys:

- **Control your blood sugar.** Keep your blood sugar as close to normal as possible. The American Diabetes Association recommends a hemoglobin A1c (A1c) target level of less than 7 percent for most nonpregnant adults. The lower your A1c, the better your chance of stopping kidney damage.
- **Lower your blood pressure.** Controlling your blood pressure can help to slow the damage to your kidneys. Doctors recommend certain protective blood pressure medicines for all people who have diabetes and kidney disease. Examples of these medicines are ACE inhibitors and angiotensin II receptor blockers (ARBs).
- **Take your medicines.** You may need to take several medicines. For instance, you may need a medicine for your diabetes, another to lower cholesterol, and another to lower your blood pressure. It is very important to take all your medicines just as your doctor tells you and to keep taking them. Call your doctor if you think you are having a problem with your medicine.
- **Eat less salt.** Try to limit the amount of salt you eat to less than 1,500 mg a day.
- **Eat wisely.** Follow an eating plan that is good for both your diabetes and your kidneys. A registered dietitian can help you make an eating plan that spreads carbohydrate throughout the day and also has the right amounts of salt (sodium), fluids, and protein.

- **Stay at a healthy weight.** If you need help to lose weight, talk to your doctor or dietitian. Even small changes can make a difference. Try to be aware of your portion sizes, eat more fruits and vegetables, and add some activity to your daily routine.
- **Exercise.** Get at least 2½ hours of moderate exercise a week. One way to do this is to be active 30 minutes a day, at least 5 days a week. It's fine to be active in blocks of 10 minutes or more throughout your day and week. Walking is a great exercise that most people can do. Being more active can help you control your blood sugar as well as maintain a healthy weight, lower high cholesterol, and lower high blood pressure.

There also are other steps you can take to improve your kidney health:

- **Manage your cholesterol.** A healthy lifestyle along with medicine can help lower your cholesterol and your risk of heart and blood vessel problems.
- **Follow your treatment plan.** Check your blood sugar as many times a day as your doctor recommends. Keep a record of your readings, and bring it with you to all your doctor visits. Keep all your follow-up appointments, and have all the tests your doctor orders.
- **Avoid tobacco.** Do not smoke or use other tobacco products. If you need help quitting, talk to your doctor about stop-smoking programs and medicines. These can increase your chances of quitting for good.
- **Drink little or no alcohol.** Limiting alcohol can lower your blood pressure and lower your risk of kidney damage.
- **If you have talked about it with your doctor, take a low-dose aspirin every day.** Aspirin can help certain people lower their risk of a heart attack or stroke. But taking aspirin isn't right for everyone, because it can cause serious bleeding. Do not start taking daily aspirin unless your doctor knows about it.

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Heart Disease: Lifestyle Changes to Lower Risk

If you have heart disease, you can help lower your risk of a heart attack and stroke with healthy lifestyle changes. A healthy lifestyle can also improve the quality and length of your life.

You can lower your risk for heart attack and stroke by making lifestyle changes and taking medicine.

To be heart-healthy, eat healthy foods, be active, stay at a healthy weight, and don't smoke.

Making lifestyle changes

It's not easy to make changes. But taking the time to really think about what will motivate or inspire you will help you reach your goals. Also, the more support you have for making a lifestyle change, the easier it is to make that change.

Ask your doctor if a cardiac rehabilitation (rehab) program is right for you. In cardiac rehab, you will get support to help you build new, healthy habits.

Getting active

Before you start a new activity, talk to your doctor about how much exercise is safe.

Start slowly, and go at a pace you can manage. Try to do at least 2½ hours of moderate exercise a week. One way to do this is to be active 30 minutes a day, at least 5 days a week.

Walking is an easy, low-cost way to be active. Walking with a partner helps you keep up a routine. Try using a phone app or pedometer to count your steps and set walking goals.

Here are some other ideas for getting active:

- Work in the yard or garden.
- Swim or go for a bike ride.
- Join a health club or walking group.

No matter what you do, the key is making physical activity a regular, fun part of your life.

Heart-healthy eating

Healthy eating starts with learning new ways to eat, such as adding more fresh fruits, vegetables, and whole grains and cutting back on foods that have a lot of saturated fat, sodium, and sugar.

Heart-healthy foods include:

- Lean meat, poultry, fish, and beans.
- Fruits and vegetables.
- Whole grains and cereals.

You can work with a dietitian to make a healthy eating plan.

Healthy weight

Getting active and eating a healthy diet can help you lose extra weight.

You'll have more success getting to a healthy weight if you first change the way you think about certain things:

- Don't compare yourself to others. Healthy bodies come in all shapes and sizes.

- Pay attention to how hungry or how full you feel. When you eat, pay attention to why you're eating and how much you're eating.
- Decide that you're going to improve your health and plan exactly what you'll do to reach that goal.

Quit smoking

Quitting smoking may be the best thing you can do for your heart and your body. It is hard to quit. But there are many things that can help you. Ask your doctor about:

- Medicine.
- Support groups and quitting smoking programs.
- Internet programs and smartphone or tablet apps.

Tips for getting support

- Partner with someone who is also making lifestyle changes.
- Get friends and family involved.
- Join a class or workout group.
- Give yourself positive reinforcement.

Taking medicine

You will also take medicine that lowers your risk for heart attack and stroke. This includes medicine to:

- Lower risk of blood clots.
- Lower blood pressure.
- Lower cholesterol.

Even though you are taking medicine, it is always important to make lifestyle changes that keep your heart and your body healthy.

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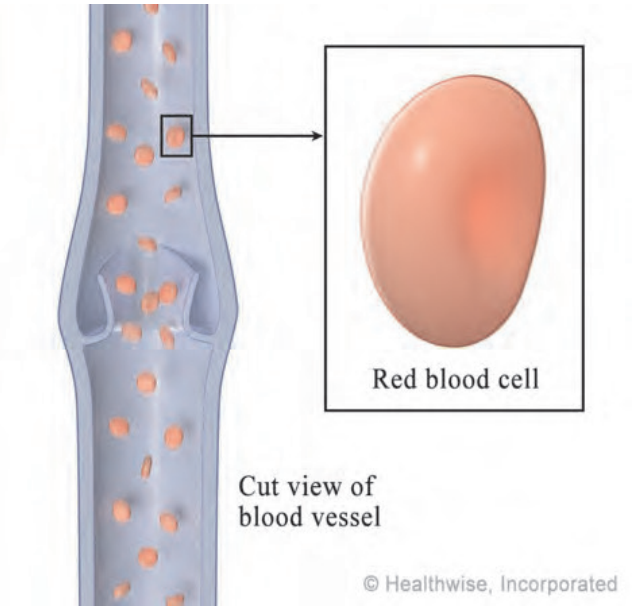
Kidney Disease: Anemia



Anemia means that you do not have enough red blood cells. Red blood cells carry oxygen from your lungs to your body's tissues. If your tissues and organs do not get enough oxygen, they cannot work as well as they should.

Anemia is common in people who have chronic kidney disease. It can make you feel weak and tired.

With treatment, you may feel better and enjoy life more.

How kidney disease causes anemia

Red blood cells are produced by the bone marrow. To stimulate the marrow to make red blood cells, the kidneys produce a hormone called erythropoietin, or EPO. When the kidneys are damaged, they may not produce enough EPO. Without enough EPO, the bone marrow does not make enough red blood cells, and you have anemia.

Usually, the more damaged the kidneys are, the more severe the anemia is.

In general, people whose kidneys are working at one-third or less of their normal level may get anemia.

Symptoms of anemia

Anemia may develop early in kidney disease, but you may not have symptoms until the late stages of the disease.

As anemia gets worse:

- You may feel weak and tire out more easily.
- You may feel dizzy.
- You may be irritable.
- You may have headaches.
- You may look very pale.
- You may feel short of breath.
- You may have trouble concentrating.

Tests for anemia

Your doctor can check for anemia by doing two blood tests:

- Hemoglobin (Hgb) test. This test measures the level of hemoglobin in your blood. Hemoglobin is the substance in red blood cells that carries oxygen. This is the best test for anemia.
- Hematocrit (Hct). A hematocrit test shows your doctor how much of your blood is made up of red blood cells.

Your doctor will repeat these tests to see how well treatment is working.

Treatment of anemia

The two main treatments for anemia in kidney disease are **EPO** and **iron**.

- If tests suggest that your kidneys are not making enough EPO, you may need a man-made form of EPO. It is called an erythropoietin-stimulating agent (ESA). This medicine usually gets injected under the skin (subcutaneous).
- To build the iron levels in your body, you may need to take iron pills or get iron through an injection into a vein (IV.)

Both treatments can be given through an IV during dialysis.

Other possible treatments include:

- Vitamin B12 or folic acid supplements. Vitamin B12 is given as a shot into the muscle. Folic acid comes in pill form.
- Diet changes. Ask your doctor if eating more foods high in iron, folic acid, and vitamin B12 could help your anemia. But do not make changes to your diet without talking to your doctor first.
- In rare cases, a blood transfusion, if your anemia is severe. A blood transfusion gives you new blood or parts of blood you need, such as red blood cells.

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Kidney Disease: ESA Medicines for Anemia

When you have kidney disease, you are at risk for not having enough red blood cells. This is a condition called anemia. It can make you feel weak and tired. Erythropoietin-stimulating agents (ESAs) are medicines that doctors use to treat anemia. They help you make more red blood cells. Two common ones are epoetin alfa and darbepoetin alfa.

How do ESAs work?

ESAs are man-made forms of erythropoietin, which is a substance made by the kidneys that helps make red blood cells.

ESAs help your body make new red blood cells. They help prevent and treat anemia caused by kidney disease. People on dialysis and people who have advanced kidney disease are the most likely to need to take an ESA.

How are they given?

ESAs are usually given as a shot under your skin 2 or 3 times a week. Some types may be given once a week, or even every other week, or less often. ESAs can also be given in an IV (a shot into the vein) during dialysis.

Your body needs iron for ESAs to work. So your doctor will likely have you take iron supplements if you use an ESA.

Your doctor will teach you how, when, and where to inject ESA. Follow these general rules:

- Keep the medicine in the refrigerator at 36 to 46 degrees. Let it come to room temperature for about 15 minutes before you measure a dose.
- Store it away from light or moisture.
- Keep ESAs out of the reach of children.
- Do not shake an ESA. This can ruin the medicine.
- Do not reuse the needles or syringes. Use a puncture-resistant container to hold the used needles and syringes. You can get a container at your doctor's office or pharmacy. Ask your doctor where to take the container for proper disposal when it is full.

How will you know if ESA therapy is helping?

Your doctor will do a blood test called a hemoglobin and hematocrit level to see if your red blood cell count is getting better. Talk to your doctor about how often you will need this test.

The goal is to improve your anemia over a period of weeks. It is important not to improve it too quickly or too slowly. Hemoglobin levels that are too high may increase your risk for death, heart failure, heart attack, and stroke. Talk with your doctor about your concerns. And keep all your appointments for blood tests.

Anemia makes you feel tired and weak. Once you start taking an ESA, you may start to feel better and have more energy. Your appetite also may improve.

Will you be able to stop taking ESAs?

How long you take an ESA depends on the stage of your kidney disease and whether your anemia is getting better. Talk with your doctor about how long he or she expects you to need it.

What are the side effects?

Ask your pharmacist about the side effects of each medicine you take. Side effects are also listed in the information that comes with your medicine.

Common side effects of these medicines include:

- Stomach pain.
- Skin rash or redness.

Call your doctor if you think you are having a problem with your medicine.

Call 911 right away if you think you are having a serious reaction, such as a seizure or trouble breathing.

Do you have any questions or concerns after reading this information? It's a good idea to write them down and take them to your next doctor visit.

Kidney Disease: Medicines You Should Avoid

Your kidneys remove, or filter, waste from your blood. They also help keep your body's fluids and chemicals in balance. If you have kidney disease, your kidneys cannot filter your blood the way they should. Waste can build up in your blood and make you sick.

One way to help avoid more harm to your kidneys is to be careful about the medicines you take.

Your doctor can help you avoid medicines that may harm your kidneys.

Being careful with certain medicines

Common medicines that your doctor may change or adjust include:

- Pain medicines.
  - Nonsteroidal anti-inflammatory drugs (NSAIDs) can reduce the flow of blood to your kidneys. Examples are ibuprofen and naproxen. NSAIDs are also found in medicines for fever, colds and coughs, and sleep problems.
  - Acetaminophen and aspirin may be harmful if overused. They are usually safe in small amounts.
- Statins, used for high cholesterol.
- Diabetes medicines.
- Heartburn and upset-stomach medicines. These medicines can affect your electrolytes.
- Antimicrobial medicines. These include some antibiotics, anti-fungal, and antiviral medicines.
- Herbal products. Many herbs can interact with other medicines. And some contain minerals like potassium that are harmful for people who have kidney disease. Always check with your doctor or pharmacist before you take herbal products.

Your doctor may suggest a different medicine for you. Or your doctor may say it's okay for you to continue to take a medicine but may change how much you take. Don't stop taking any prescription medicines without talking to your doctor first.

How to work with your doctor

Keeping track of your medicines can be a challenge sometimes, especially if you are taking many different kinds. By working closely with your doctor, you can stay safe and avoid medicines that may harm you. Here are some important tips:

- Make sure your doctor knows all the medicines you take. This includes over-the-counter (OTC), prescription, and herbal medicines, and any vitamins or supplements.
- Keep a current list of all your medicines. Take the list with you each time you see your doctor or see a new doctor.
- Talk with your doctor first before you take **any** new medicines or herbal products.

- Take your medicines exactly as your doctor says. And always follow the directions on the label.
- Ask your doctor about using medicines other than NSAIDs for pain relief.
- Tell all of your doctors and other health professionals that you have kidney problems. This will help you avoid getting medicines that may harm your kidneys.
- If you have kidney disease, wear medical alert jewelry that lets others know. You can buy this jewelry at most drugstores.

Do you have any questions or concerns after reading this information? It's a good idea to write them down and take them to your next doctor visit.

Senior Health: How to Manage Pain

Pain is one of the most common complaints among seniors.

Like many seniors, you may not want to admit you have pain. But the fact is that there are lots of treatments that can help with your pain.

Tell your doctor when you are in pain. Describe it in as much detail as you can. The more your doctor knows about your pain, the more he or she can help you manage it.

Using pain medicines safely

Over-the-counter medicines

Acetaminophen (Tylenol) is often the first choice for treating mild to moderate pain in seniors. It works as well as anti-inflammatory drugs in most cases. But it should be used with caution in people who have liver problems.

Nonsteroidal anti-inflammatory drugs (NSAIDs), such as aspirin (Bayer, Bufferin), ibuprofen (Motrin, Advil), and naproxen (Aleve), are not as safe for seniors as acetaminophen is. NSAIDs have side effects that include upset stomach, heartburn, nausea, constipation, and dizziness. People who are older than 65 are more likely to have serious side effects, like intestinal bleeding or upset stomach. NSAIDs also may cause high blood pressure and have been linked to heart disease.

If you have kidney problems or if you are older than 65, talk to your doctor before you take any anti-inflammatory drug.

Opiate pain relievers

These are strong medicines that must be prescribed by your doctor. Opiates (also called opioids or narcotics) include hydromorphone, morphine, and oxycodone. They often come in a mixture with aspirin or acetaminophen to treat moderate to severe pain.

Seniors may be more likely to feel the side effects of opiates, including constipation, nausea, and sleepiness. They may need lower-than-normal doses of medicine.

You may be afraid of becoming addicted to this type of medicine. But addiction to opiates is rare when the drugs are used for pain under a doctor's care.

Drug interaction

Drug interaction is the way different medicines react to each other when you take them together. This interaction can sometimes cause serious problems. Some drugs cause more problems than others and may increase your risk for falling.

You may already be taking one or more drugs to treat other problems, such as diabetes, arthritis, high cholesterol, heart disease, or high blood pressure. Be sure your doctor knows all the drugs you are taking, including herbs, vitamins, and over-the-counter medicines.

How can you manage pain at home?

To manage your pain at home, it may help to:

- Pace yourself. Break up large jobs into smaller tasks. Save harder tasks for days when you have less pain, or go back and forth between hard tasks and easier ones. Take rest breaks.
- Keep moving. Gentle, daily exercise can help reduce pain over the long run.
- Try heat, cold packs, and massage.
- Get enough sleep. Talk with your doctor if you have trouble sleeping.
- Cut down on caffeine in sodas, coffee, tea, and chocolate.
- Eat healthy foods.
- Think positive. Your thoughts can affect your pain level. Do things that you enjoy to distract yourself when you have pain instead of focusing on the pain.

Other options

Medicines

If pain relievers do not help, there are other medicines that may help you. These include medicines usually used for depression or seizures, corticosteroids, a lidocaine patch, and pain relievers you put directly on skin.

Complementary therapies

For some people, complementary therapies can help with pain. These include:

- Acupuncture.
- Biofeedback.
- Guided imagery or meditation.
- Hypnosis.
- Massage.
- Yoga.

When to call a doctor

- Your pain gets worse or is out of control.
- You have trouble sleeping.
- You feel down or "blue," or you do not enjoy things like you once did.
- You are very worried or anxious about your pain.
- You have trouble taking your pain medicine.
- You have any concerns about your pain medicine.
- You have trouble with constipation.
- You do not get better as expected.
- You have any new symptoms.

Kidney Disease: How to Get the Right Amount of Protein

Your body needs protein to help build and repair muscle, skin, and other body tissues. Protein also helps fight infection, balance body fluids, and carry oxygen through the body. However, people with kidney disease often have special protein needs.

- You may need to eat a low-protein diet.
- If you are on dialysis, you may need to eat a little more protein.

Your doctor or dietitian can help you figure out how much protein you need each day. This will depend on your weight, the health of your kidneys, and whether you are on dialysis.

What happens if you get too much protein?

Eating more protein than your body can handle can make you very sick.

When protein breaks down in your body, it forms waste products, including urea. Healthy kidneys can clear urea out of the body. When you have kidney disease, the kidneys have trouble getting rid of waste products. These waste products can build up in your blood and cause serious health problems.

Limiting protein may:

- Reduce symptoms of kidney disease.
- Help your kidneys stay healthier longer.

What happens if you do not get enough protein?

Eating too much protein can stress the kidneys, but you need to eat enough to stay as strong and healthy as you can. If your diet is too low in protein:

- You may start to have trouble avoiding infections and illnesses.
- You may feel tired and not have a lot of energy.
- You may feel weak or lose muscle strength.

This is called malnutrition. It is very serious in any person with kidney disease.

> Work with your doctor and a dietitian to make an eating plan that balances your need for less protein with enough protein to stay healthy.

What are the best sources of protein?

Some sources of protein are easier for the body to use than others. Try to get most of your protein from these sources so that you limit the urea in your blood and reduce the strain on your kidneys.

High-quality, healthy proteins:

- Low-fat meats
- Fish
- Chicken and other poultry
- Eggs, especially the white part

- Milk and milk products. However, because you may need to limit the fluids in your diet, milk may not be the best source of protein for you. If you do drink milk, be sure to count it as part of your daily fluids.

Do you have any questions or concerns after reading this information? It's a good idea to write them down and take them to your next doctor visit.

Kidney Disease: How to Get the Right Amount of Potassium

Potassium is a mineral in your body fluids that helps your nerves, muscles, and heart work right.

The right balance of potassium keeps your heart beating at a steady rate.

Healthy kidneys keep the right balance of potassium in the blood. If you have kidney disease, are on dialysis, or take certain medicines, your potassium level can get too high or too low.

Since your kidneys cannot control the level, you may need to increase or reduce the potassium in your diet.

The amount you need will depend on what kind of treatment you have. It may change over time as your kidney function and treatments change.

If you are treated with hemodialysis, you may have high potassium.

If you are treated with peritoneal dialysis, you may have high or low potassium. Some medicines may also affect your potassium levels.

Checking your potassium

You need to have regular blood tests to check your potassium.

Levels that are too high or too low can be dangerous. The tests also help your doctor know how well your treatment is working.

How much potassium do you need?

Your doctor will test your blood often. Using the results, you will work with your doctor or a dietitian to learn how much and what kinds of food you can safely eat.

You will want to keep your blood potassium level at a normal range of 3.5 to 5.0. At times, you may need more or less.

You may want to keep a record of what you eat and drink. This will help your dialysis team know how to adjust your treatments.

Hidden potassium

Some foods and drinks may have hidden potassium.

Certain herbal or dietary supplements may also have it. Diet or protein drinks and diet bars often have this mineral.

It is also in sports drinks, such as Gatorade, which are meant to replace potassium you lose during exercise.

Watching what you eat

Potassium is in many foods, including vegetables, fruits, and milk products.

Foods high in potassium include:

- Bananas.
- Broccoli.

- Cantaloupe.
- Milk.
- Sweet potatoes.
- Tomatoes.

Ask your doctor or a dietitian for a full list.

Foods low in potassium include:

- Blueberries.
- Cranberry juice cocktail.
- Cucumber.
- Raspberries.
- Spaghetti or macaroni.
- White or brown rice.

Using food labels

Food labels do not have to include the amount of potassium, but some do. Even if potassium is not listed, it may still be in that food.

When you first check a label, look at the serving size. All of the facts on the label are based on one serving of the food. But the package may have more than one serving. A serving size is often less than a person normally eats.

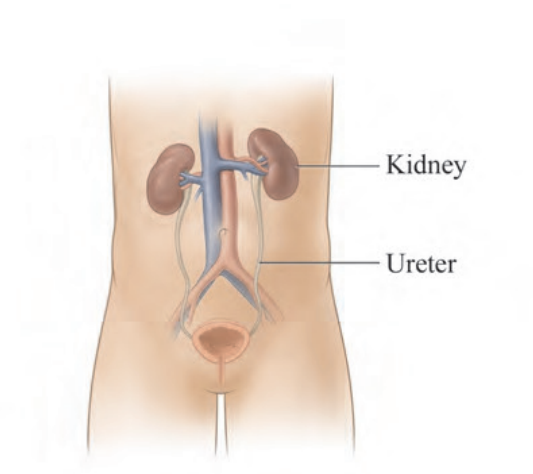
The amount of potassium shown on a label is based on the Recommended Daily Allowance (RDA) for healthy adults. Because you have kidney disease, your needs are different. To see which foods to avoid, use this table as a guide.

Low-potassium foods	Medium-potassium foods	High-potassium foods	Very high-potassium foods
Less than 100 mg per serving	101–200 mg per serving	201–300 mg per serving	Over 300 mg per serving

The table refers to potassium amounts for one serving of a food.

One serving of fruit is one small piece, ½ cup fresh, canned, or cooked fruit, ¼ cup dried fruit, or ½ cup juice. One serving of vegetables is ½ cup fresh or cooked vegetables, 1 cup raw leafy vegetables, or ½ cup juice. For more information, contact the U.S. National Kidney Foundation at www.kidney.org.

Kidney Disease: How to Control Your Fluids



Why do you need to control your fluids?

When you have chronic kidney disease, your kidneys have trouble getting rid of extra fluids. The extra fluid can raise your blood pressure and force your heart to work harder.

You can help your kidneys and your heart by watching how much fluid you drink each day and not taking in more than your body can handle.

You will probably also need to watch your sodium (salt) intake, which affects how much fluid your body holds onto.

How much fluid is safe for you is based on the stage of your kidney disease and other health problems you may have.

You will need to work closely with your doctor or dietitian to figure out how much fluid you can have each day. Then, try not to go over that amount.

What counts as a fluid?

Fluids in your diet include:

- Anything you drink, such as water, milk, tea, coffee, soda, juice, and sports drinks.
- Foods that have a lot of liquid. Examples are gelatin dessert, soup, gravy, sauces, and some fruits and vegetables, such as grapes, melons, oranges, tomatoes, lettuce, and cucumbers.
- Foods that will melt, such as ice and ice cream.
- The liquid in canned fruits and vegetables. Count it as a fluid or drain well before serving.
- Alcohol. Check with your doctor about whether it is safe for you to drink alcohol. If you do drink alcohol, have no more than 1 drink a day.

How do you know if you have too much fluid in your diet?

You may be taking in more fluid than your body can handle if:

- You have swelling in your legs and ankles.
- You gain weight (more than 1 or 2 pounds) over a short period of time or between dialysis sessions.
- You are short of breath. This happens when fluid builds up around your lungs.

How do you measure fluids?

You may need to keep track of exactly how much fluid you drink. Here are a couple of ways to do this:

- Write down how much you drink every time you drink or eat something that counts as a fluid. This is an easy way to keep track as long as you remember to do it every time. It may help to keep a notebook with you so that you always have a place to record how much you drink.

- Some people keep a container filled with the amount of fluid allowed for that day. If they drink from a source other than the container or eat a food that counts as a fluid, then they pour out that amount. When the container is empty, you know you have reached your fluid limit for the day.

Find a method that works for you. Any method is fine as long as it helps you know when you have reached your fluid limit for the day.

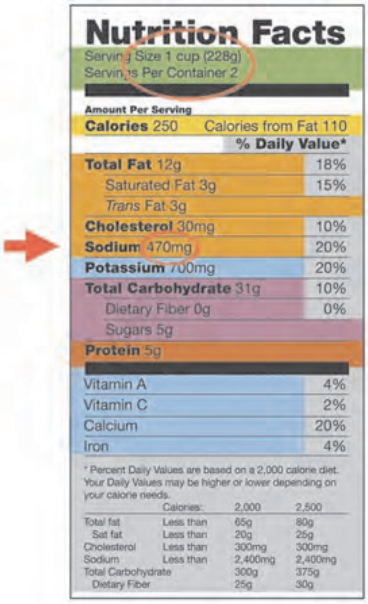
It is easy to measure liquids like water and milk. Just measure the glass you drink out of. For foods that count as fluids, you may need to ask a dietitian for help on how to measure the fluid in them.

How to control your thirst while you are drinking less

- Spread your fluids over the day instead of drinking a lot at once.
- Chew gum, or suck on hard candy.
- Ask your doctor or pharmacist if any of the medicines you take can make your mouth dry or increase thirst. You may be able to take a different medicine that does not have these side effects.

Do you have any questions or concerns after reading this information? It's a good idea to write them down and take them to your next doctor visit.

Kidney Disease: How to Keep Your Sodium Low



Sodium is a mineral that helps balance fluids in your body. It also helps your nerves and muscles work properly. Your kidneys help your body maintain the right amount of sodium. When you have kidney disease, your kidneys have trouble clearing extra sodium from your body.

What happens when you have too much sodium in your diet?

If you have kidney disease, a high-sodium diet can cause fluid to build up in your body. As a result:

- You may have swelling in your feet, legs, and belly.
- Your blood pressure may go up.
- Your heart has to work harder.
- You put extra stress on your kidneys.
- You will get thirsty, and it will be hard to limit how much fluid you drink.

Where do you find sodium?

Salt is the most common form of sodium in your diet. But table salt is only one source of sodium in your diet. Other sources of sodium include:

- Most foods and drinks. Even bottled water can have sodium.
- Medicines.
- Products like mouthwash and toothpaste.

Using food labels

Get in the habit of reading food labels before you buy foods. Most food labels list how much sodium is in each serving. The amount of sodium shown on a label is based on the Recommended Daily Allowance (RDA) for healthy adults. If you have kidney disease, you probably need less than the RDA. Talk to your doctor or dietitian about how much sodium you should have each day.

Choose foods low in sodium

Some of these tips may help when you shop for or prepare foods:

- Read food labels and look for hidden sodium. For example, sodium may be listed as monosodium glutamate (MSG) or disodium phosphate.
- Prepare your food at home instead of buying prepared meals, fast food, or other processed foods. It is easier for you to control the salt when you make the food yourself.
- Use fresh or frozen vegetables and fruits instead of canned ones.
- Use lemon, herbs, and other spices to add flavor to your food. Do not add salt to your food.
- Ask your doctor if it is okay to use a salt substitute. If you also need to limit your potassium, salt substitutes may not be good for you. Most of them are very high in potassium.

You do not need to cut salt out of your diet entirely. But try to choose foods that are low in sodium, and avoid high-sodium foods.

Foods low in sodium	Foods high in sodium
• Uncured meats, fish, and poultry • Fresh or frozen fruits and vegetables • Milk and milk products • Low-salt or no-salt versions of foods (canned soups and vegetables, crackers, cheese, peanut butter)	• Smoked, cured, salted, and canned meat, fish, and poultry • Ham, bacon, hot dogs, and lunch meats • Fast food, Chinese food, and other restaurant foods • Canned and dehydrated soups and broths • Frozen prepared meals • Salted snack foods such as crackers with salted tops and chips • Hard and processed cheese • Canned vegetables • Pickles, sauerkraut, seasonings high in salt, ketchup, and soy sauce

Do you have any questions or concerns after reading this information? It's a good idea to write them down and take them to your next doctor visit.

Your Health: How to Partner With Your Doctor

Many people are happier with their health care if they share responsibility with their doctors. Your doctor is an expert on medical care, but you are the expert on yourself.

Often there is more than one choice for diagnosing or treating a condition. When you are a partner with your doctor, you can help decide what is best for your values, beliefs, and lifestyle. You will also feel more confident about carrying out the chosen treatment.

Your responsibilities

Build a relationship

- Find a doctor with whom you think you can build a long-term, comfortable relationship. It is important to find a doctor who will support this partnership.
- Tell your doctor that you want to be a partner in your health care. Tell him or her what your expectations are.
- Establish a long-term and comfortable relationship with your doctor. The relationship you have will greatly influence your ability to make wise health decisions. It can also affect the results you get from your care.

Be an active participant

- Listen carefully to what your doctor says. Make sure you understand what you are told about any diagnosis or treatment.
- Ask questions. If you do not understand something, ask the doctor or nurse to repeat it in a different way.
- Ask for instructions. Before you leave the doctor's office, make sure you know what you are supposed to do to care for yourself. Ask for written information or instructions.

Be honest

- Be honest. If your values, beliefs, fears, or concerns might interfere with a treatment that your doctor suggests, talk to him or her about it. There may be other choices available.
- If you do not intend to take a prescribed medicine or follow a recommended treatment plan, say so. Your doctor expects a certain response from the medicine or treatment being prescribed. If you do not stick to the plan, he or she will not know why you are not getting better or how to help you. Also tell your doctor your reasons. There may be other options for treating you.
- If you are using complementary treatment, such as acupuncture, or you are taking herbal supplements, let your doctor know. To be a good partner, your doctor has to know what is going on.

If you are telling your doctor about a health problem, get answers to the following questions by the end of your appointment:		
What is my diagnosis and what might happen next?		
Do I need medicine? No ___ Yes ___ If yes, fill in the information below.		
Name of medicine	How much and how often	What to watch for
How should I care for myself at home? (eating, sleeping, exercise, other)		
Do I have any concerns about being able to carry out my part of the treatment?		
Where can I get more information about this problem or the treatment?		
What symptoms should I watch for?		
When should I call to report symptoms?		
What is the best way to contact my doctor?		
When is the next time I should contact my doctor?		
Call for test results. Date and time: _____		Return for an appointment. Date and time: _____
Call to report how I am doing. Date and time: _____		No follow-up contact needed. _____

Kidney Disease: Treatment for Kidney Failure

How well your kidneys work is called kidney function. When kidney function falls below a certain point, you have kidney failure.

Kidney failure means your kidneys may no longer be able to keep you alive. If your kidneys get to the point where they can no longer remove waste, you may need dialysis or a new kidney. Many people have successful kidney transplants or live for years using dialysis.

Once you understand your options, you can make the choice that is best for you.

How kidney failure affects your body

Kidney failure affects your whole body and makes you feel very ill. Kidney failure can cause many problems, such as:

- A buildup of waste products and fluids in your body. This can affect many parts of your body, including the intestines, nerves, and heart.
- Anemia, which can make you feel weak and tired.
- Imbalances of minerals called electrolytes. This can cause an irregular heartbeat, muscle weakness, and other problems.
- Heart disease.
- Bone disease.

Treatment for kidney failure

If your kidneys reach the point where they can no longer remove waste, treatment options may include dialysis, kidney transplant, or no treatment.

Dialysis is a process that filters wastes from the blood when your kidneys can no longer do the job. It is not a cure, but it can help you live longer and feel better.

There are two basic types of dialysis:

- **Hemodialysis** uses a man-made membrane called a dialyzer to clean your blood. You are connected to the dialyzer by tubes attached to your blood vessels. Before dialysis treatments can begin, the doctor creates a site where blood can flow in and out of your body. This is called the dialysis access. There are three types of dialysis access:
  - A fistula is an access made by directly connecting an artery to a vein, usually in the upper arm or forearm.
  - A graft is an access made by inserting a small tube between an artery and a vein, usually in the upper arm or forearm.
  - A catheter is an access made by inserting a tube into a large vein, often in the neck or chest.

- **Peritoneal dialysis** uses the lining of your belly (or peritoneal membrane) to filter your blood. Before you can begin peritoneal dialysis, your doctor will need to place a catheter in your belly to be the dialysis access.

Each type of dialysis has pros and cons:

- Peritoneal dialysis can be done at home. Most people have hemodialysis at a dialysis center. But some people can do it at home.
- Peritoneal dialysis must be done every day. Home hemodialysis is done almost every day. In-center hemodialysis is usually done 3 times a week.
- Hemodialysis requires more food and fluid restrictions than peritoneal dialysis.

Kidney transplant may be a good choice if you are in good basic health. With a new kidney, you will feel much better, have a more normal life, and live longer. Finding a live donor is the best option, with the shortest wait and longest survival. A live donor may be either related or unrelated to you. Another option is to get a kidney from someone who died.

There are some drawbacks:

- If you cannot find a live donor, the wait for a transplant may be long. You will probably need to have dialysis while you wait for a kidney.
- It may be hard to find a good match for your blood and tissue types.
- You will have to take medicine called immunosuppressants for the rest of your life. These medicines lower your body's disease-fighting ability, so they increase your risk of getting infections or cancer.

It is hard to make treatment decisions when you are very ill. It may help to visit the dialysis center or transplant center and talk to others who have chosen these options.

Choosing not to treat kidney failure

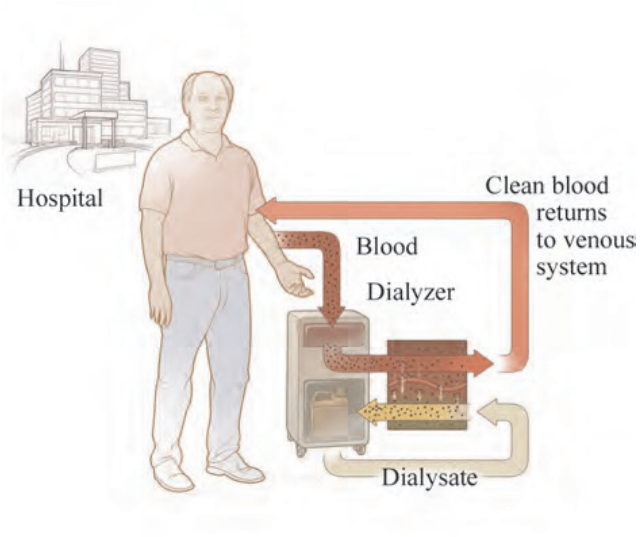
Some people choose not to treat their kidney failure. Usually these people have other serious health problems besides kidney failure. They understand that if their kidneys are no longer able to remove waste successfully, choosing not to have treatment means they will live only a short time.

You have the right to choose not to treat your kidney failure or to stop treatment later on. Of course, this is a very personal decision. Discuss your thoughts and feelings with your loved ones and your doctor. You can change your mind at any time.

Another option is to try dialysis for a month or two. This is useful if you are not sure whether you want dialysis. Be clear on what your goals are. If you are not meeting those goals after trying dialysis, you might then choose not to continue dialysis.

Do you have any questions or concerns after reading this information? It's a good idea to write them down and take them to your next doctor visit.

Kidney Disease: Hemodialysis



Dialysis is a process that does the work for your kidneys when you have kidney failure. Dialysis filters wastes, removes extra fluid, and restores the proper balance of chemicals in the blood.

"Hemo" means "blood." Hemodialysis uses a man-made filter called a dialyzer to clean your blood.

Hemodialysis does not cure chronic kidney disease, but it can help you live longer and feel better.

How is hemodialysis done?

For hemodialysis, you are connected to a dialysis machine by tubes attached to your blood vessels. Your blood is slowly pumped through a filter, or dialyzer. The dialyzer removes waste products and extra fluids. The filtered blood is then pumped back into your body.

About once a month you will have blood tests. These tests help your doctor see how well hemodialysis is working.

How many treatments will you need?

A hemodialysis session usually lasts from 3 to 5 hours and is usually done 3 times a week. You can read, talk, watch television, or sleep during your dialysis sessions. Some kinds of home hemodialysis are done more often or for longer amounts of time.

Once you start dialysis, you will be on a regular schedule. For example, you might go in for treatments every Monday, Wednesday, and Friday. Or you may have home hemodialysis every night when you get home from work.

It is very important that you have your treatments as often as your doctor tells you to. Following your treatment schedule will allow you to stay as healthy as possible and avoid being in the hospital.

Where will you go for treatments?

You will go to a clinic called a dialysis center for your treatments. Specially trained nurses and technicians will handle your care. It is a good idea to visit the dialysis center before your treatments begin. This can help you get to know the staff and help you feel more at ease around the equipment.

Some centers will train you to do your own hemodialysis at home or in a self-care center. A friend or family member who is willing to help with your treatments may need to go through the training with you. Home dialysis can give you more freedom, but a regular schedule is still very important.

Preparing for hemodialysis

Before treatments can begin, your doctor will need to create a site where blood can flow in and out of your body during the dialysis sessions. This is called the dialysis access.

The doctor will prepare your dialysis access weeks to months before you need it. This allows the access time to heal.

The types of dialysis access are:

- **Fistula**. To make a fistula, your doctor will attach an artery to a vein, usually in your lower arm. Once the fistula heals, the dialysis needles can go directly into it.
  - Fistulas tend to be stronger and less likely to get infected than grafts. They are the best type of access. But they need to be prepared at least several months ahead of time.
- **Graft**. Your doctor may implant a tube called a graft under the skin in your arm. The tube connects an artery and a vein. The dialysis needles can then be put into the graft for hemodialysis.
  - A graft is a good choice if you have small veins or other problems. A graft can sometimes be used as soon as 1 week after placement.
- **Central venous catheter**. A thin tube called a catheter may be used until you are able to get a permanent access. The catheter is usually placed in a vein in your neck, chest, or leg.

Pros and cons of hemodialysis

On the plus side:

- Hemodialysis at a center is done by trained health workers who can watch for any problems.
- It allows you to be in contact with other people having dialysis. This can help provide emotional support.
- You can schedule your treatments in the evenings so you can keep working. Or you may be able to do home hemodialysis, which gives you more control over your schedule.

On the minus side:

- Hemodialysis needs to be done on a set schedule, usually 3 times a week. This can make it hard to have a normal life.
- It can cause side effects. The most common side effects are low blood pressure and muscle cramps. These can often be treated easily.
- It requires needle sticks during every treatment, which bothers some people. Others get used to it and even do the needle sticks themselves.

Do you have any questions or concerns after reading this information? It's a good idea to write them down and take them to your next doctor visit.

Kidney Disease: Types of Vascular Access

Before you can start hemodialysis, your doctor will need to create a site where the blood can flow in and out of your body during your dialysis sessions. This site is called the vascular access.

Your doctor will prepare the vascular access weeks to months before hemodialysis starts. It is important to get your access as soon as your doctor recommends it. This allows your access to heal before you use it.

For dialysis to work best, the access needs to provide a good, steady blood flow. It also must be sturdy, since it will be used at least 3 times every week.

Types of permanent vascular access

The vascular access is where the needles are put that draw the blood from your body and send it through tubes to the dialysis machine.

There are two basic types of permanent vascular access: an arteriovenous (or AV) fistula and an AV graft.

- **AV fistula.** To make a fistula, your doctor will attach an artery to a vein, usually in your lower arm. Once the fistula heals and matures, the dialysis needles can be put directly into it. Fistulas tend to be stronger and less likely to get infected than grafts. But they need to be prepared at least several months ahead of time. They are the best type of vascular access, but they can be hard to create if your veins are small or deep.
- **AV graft.** To make a graft, your doctor will implant a tube under the skin in your arm. The tube, or graft, connects an artery and a vein. The dialysis needles can then be put into the graft for hemodialysis. A graft is a good choice if you have small veins or other problems. A graft can sometimes be used as soon as 1 week after placement.

If you need to start hemodialysis right away, your doctor may place a tube in a vein in your neck, chest, or leg. This is called a central venous catheter. The catheter can be used while your permanent access heals. Catheters have a higher rate of problems, so they are not the best choice for permanent access.

Pros and cons of fistulas and grafts

You might have a choice about what type of vascular access (fistula or graft) you want. But, unless there is a medical reason for you to need a graft instead of a fistula, the AV fistula is the preferred one. Even if you do not get to choose the type of access because of a medical reason, it may still help to understand the pros and cons of each type.

This information can help you understand the types of permanent vascular access and which type is best for you. By learning all you can, you'll be more able to take an active role in your treatment.

	AV fistula:	AV graft:
Pros	• Can last for many years. • Is less likely to clot or become infected than an AV graft. • Provides a good blood flow.	• Is a choice if you have small blood vessels, which are often the result of age. • Can be used sooner than an AV fistula, usually in 1 to 3 weeks.
Cons	• Needs to be prepared at least several months ahead of use. • May not be an option if your veins are small or deep. • May require you to have a central venous catheter while you wait for the fistula to heal and mature.	• Usually does not last as long as an AV fistula. • Can develop blood flow problems. • Is more likely to clot or become infected.

Emotional factors

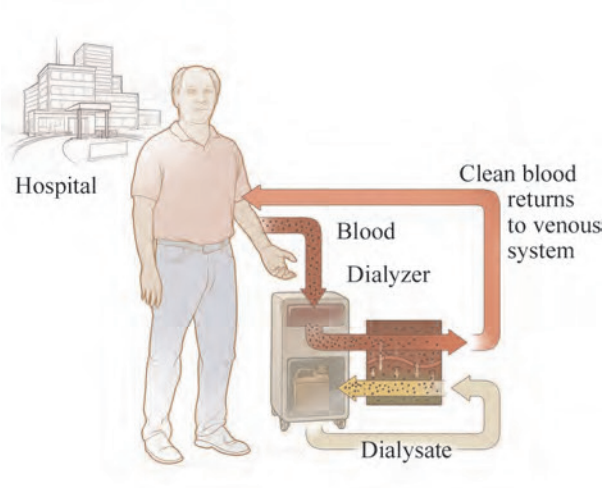
Before you start hemodialysis, it may be helpful to visit the dialysis center. This can help you feel more at ease around the equipment and understand your choices better. It also lets you get acquainted with the nurses and technicians. They will be your partners in improving your health.

You may feel some fear about having a vascular access. You may be worried about having surgery. Or you may worry about infection. Usually the surgery is done on an outpatient basis, so you do not have to stay in the hospital.

You will be able to avoid infection by taking good care of your access. Your doctor and nurses will teach you how to care for your access. Some people have problems accepting the way their arm looks with a fistula. It may help to remember that a fistula is the best type of dialysis access. It may also help to talk to other people at the dialysis center who have fistulas.

It can be hard to make decisions when you feel very ill. Discuss your concerns with your loved ones and your doctor. Do not be afraid to ask questions or get help if you need it.

Kidney Disease: How to Care For Your Vascular Access



Before you start hemodialysis, your doctor will create a site where the blood can flow in and out of your body during your dialysis sessions. This site is called the vascular access. It may be a fistula, made by connecting an artery and a vein. Or it may be a graft, which is a tube implanted under your skin.

For dialysis to work best, your vascular access needs to allow a good, steady blood flow. It also needs to be sturdy, since it will be used many times each week.

You will play an important part in protecting your vascular access. By learning how to care for your access, you will help avoid problems and get the best results from your dialysis treatments.

Care for a new vascular access

Right after the operation to create your access:

- Your arm will probably be bruised and swollen. Keep your arm raised to help reduce swelling. You can prop it on a pillow.
- Keep your bandage dry and clean. Change a dirty or bloody bandage.
- Watch for signs of problems. Call your doctor or dialysis team **right away** if you have signs of infection.

If you have a fistula, start exercises to help develop your fistula once your stitches are removed. Your doctor will recommend exercises, such as squeezing a rubber ball. No special exercises are needed for a graft.

General care guidelines

Your dialysis nurse will teach you how to take care of your catheter and access. Take some basic precautions to keep your access healthy:

- Keep your access clean, and check it every day for signs of infection.
- Before each dialysis session, wash your access arm well.
- Every day, check your access for a pulse or "thrill" in the fistula or graft area. A thrill is a vibration. To feel a pulse or thrill, place the first two fingers of your hand over the access. If you cannot feel anything, listen to the access with a stethoscope. You should be able to hear a regular whooshing sound. This is called a bruit (say "BROO-ee").
- Partner with your dialysis technicians and nurses. You can help them remember to change needle sites at each treatment.

Protect your access:

- Do not sleep on or lift heavy objects with your access arm.
- Avoid bumping or hitting your access.
- Do not wear tight sleeves or jewelry on your access arm.
- Do not let anyone take a blood pressure reading or a blood draw on your access arm.
- Make sure all health professionals you deal with know you have a vascular access.

When to call your doctor

Keep the phone numbers of your doctor and dialysis center with you at all times. **Call your doctor or dialysis team right away** if you have any signs of infection or a blood clot.

You may have an infection if:

- You have increased pain, swelling, warmth, redness, or numbness.
- You have red streaks leading from the site of the access.
- You have blood or pus draining from the access.
- You have swollen lymph nodes in your neck, armpits, or groin.
- You have a fever.

You may have a blood clot if:

- You have numbness or tingling in your hand or arm.
- Your hand or arm is cold or dusky-colored.
- You have sudden bulging around your access.
- You have no pulse or thrill in your access.
- You hear no sound of blood (bruit) in your access.

Call anytime you think your access is not working or you notice changes in your access.

Kidney Disease: Dialysis Blood Tests

Dialysis is a lifesaving treatment when you have kidney failure. When your kidneys are damaged, waste products build up in your blood and make you sick. Urea is a waste product made when protein breaks down. Dialysis takes over the work of your kidneys and removes urea and other wastes from your blood.

During dialysis, you will have regular blood tests that look at the level of urea in your blood. The level of urea gives your doctor a good idea of how well dialysis is removing waste products from your blood.

This information can help you understand more about your dialysis treatments.

How is dialysis measured?

Your doctor will use two different dialysis adequacy tests to find out how well dialysis is working. The tests are called urea reduction ratio (URR) and Kt/V.

URR is based on the levels of urea in your blood before and after a dialysis session. These two numbers are compared to see how much the urea level has decreased. This difference is called the urea reduction ratio (URR). It is usually expressed as a percentage.

Kt/V is another way to measure the effectiveness of dialysis. It compares the amount of fluid that has been cleared of urea during your dialysis session to the total amount of fluid in your body.

- "Kt" stands for the amount of fluid that is cleared of urea during each dialysis session. It is measured in milliliters per minute (mL/min).
- "V" stands for the volume of water your body contains.

The Kt/V measures the amount of urea removed with excess fluid and takes into account other factors, such as weight loss during dialysis.

If you are getting hemodialysis, you will have these tests about one time a month, or every 12 to 14 dialysis sessions. People who are getting peritoneal dialysis will have the tests every 2 or 3 months.

Why do you need to know your Kt/V or URR?

It is a good idea to know your test results. Being aware of your numbers can let you know when your treatments are not working as well as they should.

What should your numbers be?

Expert groups have developed standards for these tests. To feel your best:

- Your average URR should be 65% or better.
- Your average Kt/V should be about 1.2.

Why is your Kt/V or URR low?

There can be many reasons for a low test result. Your results may be low if you have a problem with your dialysis access, you did not have a long enough dialysis session, or your sample was taken at the wrong time. If you have a low test result one month, your measurement may be repeated.

If your average Kt/V for 3 months is below 1.2, talk to your kidney specialist (nephrologist). You may need to have your vascular access checked. Or you may need changes to your dialysis prescription.

Do you have any questions or concerns after reading this information? It's a good idea to write them down and take them to your next doctor visit.

Notes

If you have questions, call Cigna-HealthSpring
at **1-800-668-3813 (TTY 711),** seven days a week, 8 a.m. to 8 p.m.

This information is available for free in other languages. Please call our customer service number at 1-800-668-3813 (TTY 711), seven days a week, 8 a.m. to 8 p.m. Esta información está disponible de forma gratuita en otros idiomas. Por favor, llame a nuestro servicio al cliente al 1-800-668-3813 (TTY 711), siete días a la semana, 8 a.m. to 8 p.m. Cigna-HealthSpringis contracted with Medicare for PDP plans, HMO and PPO plans in select states, and with select state Medicaid programs. Enrollment in Cigna-HealthSpring depends on contract renewal.