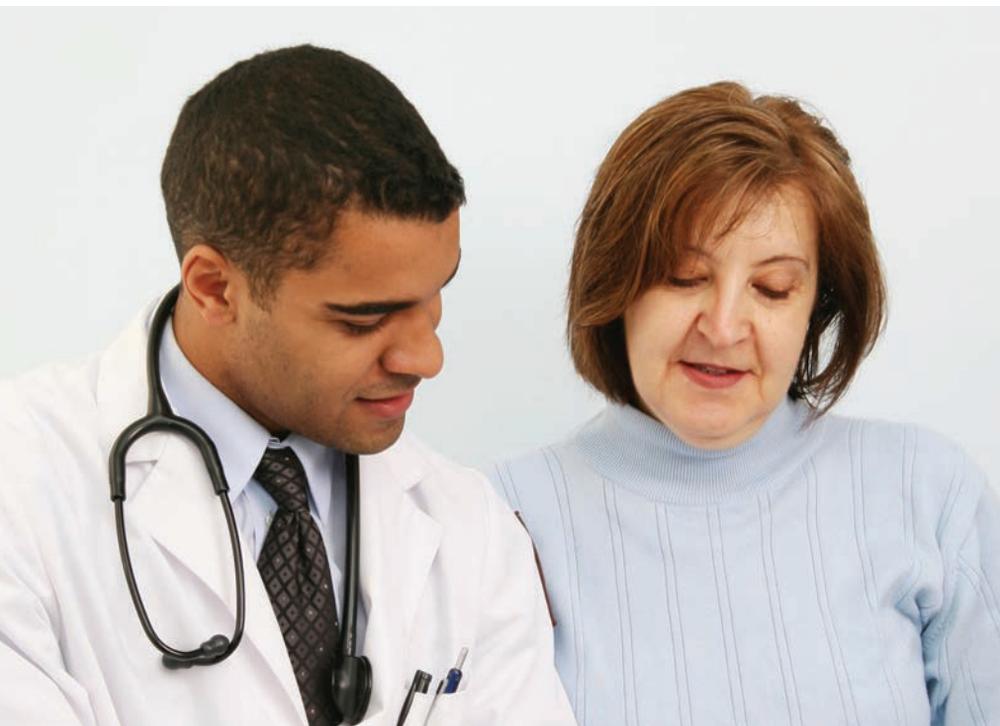


ABOUT CHRONIC KIDNEY DISEASE: A GUIDE FOR PATIENTS



National
Kidney
Foundation®

www.kidney.org

About the Information in this Booklet

Did you know that the National Kidney Foundation (NKF) offers guidelines and commentaries that help your healthcare provider make decisions about your medical treatment? The information in this booklet is based on those recommended guidelines.

Stages of Kidney Disease

There are five stages of kidney disease. They are shown in the table below. Your healthcare provider determines your stage of kidney disease based on the presence of kidney damage and your glomerular filtration rate (GFR), which is a measure of your kidney function. Your treatment is based on your stage of kidney disease. Speak to your healthcare provider if you have any questions about your stage of kidney disease or your treatment.

STAGES OF KIDNEY DISEASE

Stage	Description	Glomerular Filtration Rate (GFR)*
1	Kidney damage (e.g., protein in the urine) with normal GFR	90 or above
2	Kidney damage with mild decrease in GFR	60 to 89
3	Moderate decrease in GFR	30 to 59
4	Severe reduction in GFR	15 to 29
5	Kidney failure	Less than 15

*Your GFR number tells your healthcare provider how much kidney function you have. As chronic kidney disease progresses, your GFR number decreases.

What are kidneys and why are they important?

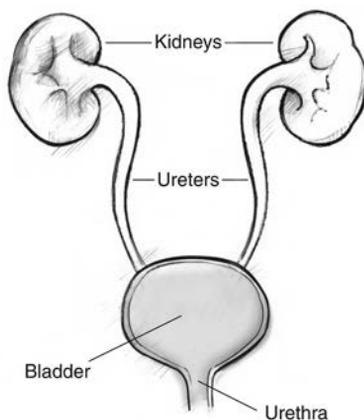
You have two kidneys. Each kidney is about the size of your fist. They are located near the middle of your back, just below the rib cage. Healthy kidneys do many important jobs. They:

- Remove waste products and extra water from your body
- Help control blood pressure
- Help make red blood cells
- Help keep bones healthy

HEALTHY KIDNEYS

Think of your kidneys as a coffee filter. When you make coffee, the filter keeps the coffee grains inside, but allows water to pass through. Your kidneys do something similar. They keep the things you need inside your body, but filter out things you don't need.

Each of your kidneys has about 1.5 million filters called nephrons. Nephrons remove wastes and extra fluid from your blood in the form of urine. The urine flows through two tubes, called ureters, to the bladder. The urine is stored there until you go to the bathroom. The wastes come from the breakdown of what you eat or drink, medicine you take, plus normal muscle activity.





What is chronic kidney disease?

Chronic kidney disease means the kidneys are damaged. Damaged kidneys are not able to keep you healthy. They cannot filter your blood well enough, and they cannot do their other jobs as well as they should.

Kidney disease does not happen overnight. It happens slowly, and in stages. Most people in the early stages do not have any symptoms. They may not know that anything is wrong. But if it is found and treated, kidney disease can often be slowed or stopped.

If kidney disease gets worse, wastes can build to high levels in your blood and make you feel sick. You may get other problems like high blood pressure, a low red blood cell count (anemia), weak bones, poor nutrition, and nerve damage. You will also have a higher chance of getting heart and blood vessel disease.

If it keeps getting worse, it can lead to kidney failure. This means your kidneys no longer work well enough to keep you alive, and you need a treatment like dialysis or a kidney transplant.

What causes kidney disease?

The two most common causes of kidney disease are:

- **Diabetes** happens when your blood sugar is too high. This causes damage to many organs and muscles in your body, including the kidneys, heart and blood vessels, nerves, and eyes.
- **High blood pressure** happens when the pressure of your blood against the walls of your blood vessels is too high. If high blood pressure is not controlled, it can cause chronic kidney disease, heart attacks, and strokes.

Many other conditions can harm the kidneys. These include:

- **Glomerulonephritis**, a group of diseases that hurt the kidneys' filtering units.
- **Inherited diseases**, like polycystic kidney disease, which causes cysts to form in the kidneys.
- **Lupus** and other diseases that affect the body's immune system.
- **Obstructions** caused by problems like abnormally shaped ureters, kidney stones, tumors, or an enlarged prostate gland in men.
- Repeated **urinary tract infections**.

Can anyone get kidney disease?

Yes. Anyone can get kidney disease at any age. But some people are more likely than others to get it. You may have a higher risk for kidney disease if you:

- Have diabetes
- Have high blood pressure
- Have a family member with kidney failure
- Are 60 years or older
- Are Black American, Asian, Hispanic, Pacific Islander, or American Indian
- Have used medicines over the course of many years that damage the kidneys

Risk factors increase your chance of getting kidney disease. The more risk factors you have, the greater the risk.



What should I do if I am at higher risk for kidney disease?

Get tested for it. Most people with early kidney disease do not have symptoms. That's why it's important to be tested. There are two simple tests to check for kidney disease:

- **Urine test**

Your urine will be tested for protein. Your body needs protein. But it should be in the blood, not the urine. Having a small amount of protein in your urine may mean that your kidneys are not filtering your blood well enough. This can be a sign of early kidney disease. Having protein in your urine is called "albuminuria."

- **Blood test**

Your blood will be tested for a waste product called creatinine. Creatinine comes from muscle tissue. When the kidneys are damaged, they have trouble removing creatinine from your blood.

But testing for creatinine is only the first step. Next, your creatinine result is used in a math formula with your age, race, and sex to find out your glomerular filtration rate (GFR). Your GFR number tells your healthcare provider how well your kidneys are working.

You should also get your blood pressure checked regularly. Having high blood pressure puts you at risk for kidney disease. Regular checkups help your healthcare provider find and treat high blood pressure. This helps lessen your risk for kidney damage.

Does kidney disease have symptoms?

Most people with early kidney disease do not have symptoms. That's why it's important to be tested. In the later stages of kidney disease, you may:

- Feel tired or short of breath
- Have trouble thinking clearly
- Not feel like eating
- Have trouble sleeping
- Have dry, itchy skin
- Have muscle cramping at night
- Need to go to the bathroom more often, especially at night
- Have swollen feet and ankles
- Have puffiness around your eyes, especially in the morning

Can I prevent kidney disease, even if I am at higher risk?

Yes. Not everyone who is at risk will get kidney disease. Talk to your healthcare provider about how to lessen your chances of getting kidney disease. You should also:

- Have regular checkups by your healthcare provider
- Control your blood sugar if you have diabetes
- Control your blood pressure if you have high blood pressure
- Make healthy food choices
- Exercise regularly

- Lose weight if you are overweight
- Stop smoking if you are a smoker
- Limit how much alcohol you drink
- Use only the medicines, vitamins and supplements that your healthcare provider recommends. Some can harm the kidneys.
- Avoid herbal supplements and those used for body building

TIP

Some pain relieving drugs can harm the kidneys if they are used for a long time. They are called NSAIDs (non-steroidal anti-inflammatory drugs). They include aspirin, ibuprofen, and naproxen. Talk to your healthcare provider if you have questions about them.

What if my test results show I already have kidney disease?

More tests might be done to help understand what caused your kidney disease. This can help in planning your treatment. You may also be asked to see a specialist. Examples of tests that might be done are:

- **An ultrasound or CT scan** to get a picture of your kidneys and urinary system. These pictures show the size of your kidneys, and whether they are too large or too small. They also show whether you have any tumors, kidney stones, or cysts.

- **A biopsy** to remove a tiny piece of kidney tissue for evaluation. The sample is studied under a microscope to:
 - See what kind of kidney damage is happening
 - See how much damage has happened
 - Plan treatment

If I have kidney disease, what will my treatment be?

Your treatment plan will depend on your stage of kidney disease and other health problems you may have. It may include:

- **Treatment for high blood pressure**
High blood pressure can make your kidney disease worse. You may need to take medicine to help control it. You may also need to eat less salt, lose weight if you are overweight, and follow a regular exercise program.
- **Protecting kidney function by taking ACE inhibitors or ARBs**
You may be asked to take high blood pressure medicines (called ACE inhibitors or ARBs), even if your blood pressure is normal. Research suggests that these medicines can slow the loss of kidney function in some people—even in people with normal blood pressure.
- **Controlling blood sugar if you have diabetes**
The best way to prevent or slow kidney damage is to keep your blood sugar well controlled. This is usually done with diet, exercise, and, if needed, insulin or pills (called hypoglycemic drugs).

- Controlling high cholesterol with diet and medication

Many people with kidney disease have high cholesterol levels in their blood. High blood cholesterol increases your risk for heart disease. Your healthcare provider will check your cholesterol at least once a year. If it is too high, you may need drugs and exercise to help lower it.

- Treatment for anemia

People with kidney disease often get anemia (low red blood cell count). Why does this happen? Healthy kidneys help your body make red blood cells. If you have kidney disease, your kidneys may not be able to do this very well and you may get anemia. Medicines called ESAs (erythropoiesis-stimulating agents) and iron supplements are used to treat anemia.

- Treatment for mineral and bone disorder

Many people with kidney disease have mineral and bone disorder. Mineral and bone disorder can make your arteries stiffen and become narrow from the extra calcium and phosphorus in your blood. This slows blood flow to your heart and can lead to heart attack and death. You may need special medicines to help treat mineral and bone disorder. You may also need to eat fewer foods that contain phosphorus, such as dairy, nuts, seeds, dried beans and peas.

- Following an exercise program approved by your healthcare provider

- Controlling your weight with diet and exercise

- Tracking how well you do

- Your GFR will be checked regularly to find out if your kidney disease is getting worse.

- The amount of protein in your urine will be checked regularly.
- Nutritional tests will be done to make sure you are getting enough protein and calories. You may be asked to follow a diet that is lower in protein. If so, you may need extra calories from other foods. A dietitian with special training in kidney disease can help you plan your meals to get the right foods in the right amounts.

See “Understanding your lab numbers” on page 18.

If I have kidney disease, can I keep it from getting worse?

Most likely. Treatment can help slow or even stop kidney disease from getting worse. How well your treatment works will depend on:

- Your stage of kidney disease when you start treatment. The earlier you start, the better off you are.
- How carefully you follow your treatment plan. Learn all you can about kidney disease and treatment for it. Make sure to follow all the steps of your treatment.
- The cause of your kidney disease. Some kidney diseases are more difficult to control.



What happens if my kidney disease gets worse?

If kidney disease gets worse, it can lead to kidney failure. Kidney failure means your kidneys no longer work well enough to keep you alive. There is no cure for kidney failure. But there are treatments to replace the work of your failed kidneys.

How is kidney failure treated?

There are two treatments for kidney failure – dialysis and kidney transplantation.

- **Dialysis** is a treatment that removes wastes and extra water from your blood. Two types of dialysis are available: hemodialysis or peritoneal dialysis.
- A **kidney transplant** is an operation that places a new kidney inside your body. The new kidney will take over the work of your failed kidneys. The new kidney may come from a living donor (usually a relative or friend) or someone who died and wanted to be an organ donor.

Your healthcare team can discuss these different treatments with you and answer all your questions. If you need a treatment for kidney failure, they will help you choose one based on your general health, lifestyle, and treatment preference. You can also call the NKF Cares Patient Help Line toll-free at **855.NKF.Cares (855.653.2273)**.

How can I cope with kidney disease?

You will have help. Finding out you have kidney disease can be hard to face. But you do not need to face it alone. Your healthcare team will help you. You may also find it helpful to speak to other people who have kidney disease. Learn all you

can about kidney disease and its treatment. Knowing what to expect and what you can do to help yourself is important. It can give you more control over your disease.

Where can I get more information?

If you have questions, speak to your healthcare team. They know you and can answer questions about you.

You can also call the NKF Cares Patient Help Line toll-free at **855.NKF.Cares (855.653.2273)** or email **nkfcare@kidney.org**. A trained professional will listen to your concerns and help answer your questions.

If you want to read more about kidney disease, the National Kidney Foundation has a lot of information on many topics, such as:

- Choosing a treatment for kidney failure
- Nutrition and chronic kidney disease
- Hemodialysis
- Peritoneal dialysis
- Kidney transplant
- Coping with kidney disease
- Glomerular filtration rate (GFR)
- High blood pressure and your kidneys
- What you need to know about urinalysis
- Working and chronic kidney disease

Key Points

- Healthy kidneys do many important jobs. They remove waste products and extra water from your body, help your body make red blood cells, help control blood pressure, and keep your bones healthy.
- When you have kidney disease, your kidneys slowly lose the ability to do the important jobs that keep you healthy. The leading causes of kidney disease are diabetes and high blood pressure.
- If you have risk factors for kidney disease, get tested for it.
- There are two simple tests for kidney disease—a urine test to check for protein in your urine and a blood test to estimate your GFR. Your GFR number helps your healthcare provider know how much kidney function you have. Having protein in your urine for several weeks is an early sign of kidney disease.
- If you have kidney disease, you will need to follow a treatment plan that may include taking medicines, restricting salt, limiting certain foods, getting exercise, and more. Your treatment plan will depend on your stage of kidney disease and any other health problems you may have.
- Finding and treating kidney disease early can help slow or even stop kidney disease from getting worse.
- If you have kidney disease, learn all you can about it. You are an important member of your healthcare team. How carefully you follow your treatment plan may affect how well you do.

- Know your numbers. Ask your healthcare provider about important tests like your GFR and the amount of protein in your urine. Keep track of them.
- If kidney disease gets worse, it can lead to kidney failure. Once kidneys fail, treatment with dialysis or a kidney transplant is needed to stay alive.



Test your knowledge: Take this True or False quiz

1. Your kidneys' only job is to remove wastes and extra fluid from your body.
True ___ False ___
2. People with diabetes or high blood pressure have a higher risk of getting chronic kidney disease.
True ___ False ___
3. People with early chronic kidney disease always have a lot of symptoms.
True ___ False ___
4. Black Americans have a low risk of getting chronic kidney disease.
True ___ False ___
5. Chronic kidney disease can be found using simple blood and urine tests.
True ___ False ___
6. Early detection and treatment can often keep chronic kidney disease from getting worse.
True ___ False ___
7. Protein in the urine for several weeks is an early sign of chronic kidney disease.
True ___ False ___
8. The best way to know how your kidneys are working is to know your glomerular filtration rate (GFR).
True ___ False ___
9. Anemia and bone disease are common complications of chronic kidney disease.
True ___ False ___
10. People with chronic kidney disease have a low risk of getting heart disease.
True ___ False ___

(See answers on page 23.)

Understanding your lab numbers

Some or all of these tests may be used to check your general health. Ask your healthcare team which tests you will have and how often they will be done. If your numbers are not in the normal range, ask how to improve them.

A1C:

This is a simple blood test that is used to diagnose diabetes and then to see how well you are managing your diabetes. It tells you what your average blood sugar level is for the past two to three months.

Blood Glucose:

If you have diabetes, controlling your blood sugar is important. Good control helps keep chronic kidney disease and other problems from getting worse. There are two ways to monitor your blood glucose. The first is with a blood glucose meter. This is a simple test that you do yourself, usually several times a day. It tells you what your blood sugar is at any moment in the day. The other way is with an A1C test. (See "A1C" above.)

Blood Pressure:

Blood pressure measures the force of your blood pushing against the walls of your blood vessels. High blood pressure happens when the pressure increases enough to cause damage. If you have high blood pressure, make sure you follow all the steps in your treatment plan. Treatment is important because high blood pressure increases your risk for heart and blood vessel disease.

Calcium:

Calcium is a mineral in the blood that is important for strong bones and teeth. People with kidney disease often develop bone and mineral disorder due to abnormal calcium levels. Testing your calcium level helps your

healthcare provider evaluate if you have mineral or bone disorder and need treatment.

Cholesterol:

- Total Cholesterol

Cholesterol is a fat-like substance in your blood. A high cholesterol level may increase your risk of having heart and circulation problems. However, a cholesterol level that is too low may mean you are not eating well enough to stay healthy.

- HDL Cholesterol

HDL cholesterol is a type of “good” cholesterol that protects your heart.

- LDL Cholesterol

LDL cholesterol is a type of “bad” cholesterol. A high LDL level may increase your chance of having heart and blood vessel problems. If your LDL level is too high, your healthcare provider may recommend changing your diet and increasing your activity level.

- Triglyceride

Triglyceride is another type of fat found in your blood. A high triglyceride level, along with high levels of total and LDL cholesterol, may increase your chance of having heart and blood vessel problems.

Creatinine Clearance:

Your creatinine clearance is another test that tells your doctor how much kidney function you have. It is done using a sample of your urine. If your creatinine clearance falls below 15, you will need to have a treatment for kidney failure, like dialysis or a kidney transplant.

GFR:

Your GFR (glomerular filtration rate) is a measure of kidney function that can be estimated from a simple blood test. If your GFR falls below 30, your healthcare professional will speak to you about treatments for kidney failure. A GFR below 15 indicates that you need to start one of these treatments.

Hemoglobin:

Hemoglobin is the part of red blood cells that carries oxygen from your lungs to all the tissues in your body. If your hemoglobin is too low, you have anemia. Anemia can make you feel tired and have little energy. Testing your hemoglobin levels is important because it helps your healthcare provider know whether you have anemia and need treatment for it. It also helps show how well your anemia treatment is working. If you have anemia due to kidney disease, you may need to take a medicine called erythropoiesis stimulating agent (ESA), along with extra iron.

Iron:

- **TSAT and Serum Ferritin**

Your TSAT and serum ferritin are measures of iron in your body. Iron helps your body make red blood cells. You may need extra iron if you have anemia.

- **Parathyroid Hormone (PTH)**

Your PTH level gives information about your mineral and bone health status. A high level of PTH may result from a poor balance of calcium and phosphorus in your blood. This can cause mineral and bone disorder. Having your PTH tested regularly is important because it helps determine whether you need treatment for bone and mineral disorder.

Phosphorus:

Phosphorus is a mineral in the blood that helps keep cells and bones healthy. Kidneys keep the blood phosphorus level in balance. A high phosphorus level can lead to weak bones. People with kidney disease need to have their phosphorus levels monitored so imbalances can be treated early.

Potassium:

Potassium is a mineral in the blood that helps your heart and muscles work properly. Healthy kidneys get rid of extra potassium in your blood. People with kidney disease should ask their healthcare provider if they need to eat foods low in potassium. A potassium level that is too high (hyperkalemia) or too low (hypokalemia) can be harmful and needs to be treated to bring the level into normal range.

Serum Creatinine:

Creatinine is a waste product in your blood that comes from the normal work of your muscles. Healthy kidneys remove creatinine from your blood, but when kidney function slows down, your creatinine level rises. Your creatinine level is used to measure kidney function. The results of your serum creatinine are used to estimate your glomerular filtration rate (GFR).

Subjective Global Assessment (SGA):

Your dietitian may use SGA to help check for signs of nutrition problems. The dietitian will ask you some questions about your daily diet, and check your weight as well as the fat and muscle stores in your face, hands, arms, shoulders, and legs. Ask your dietitian about your score on the SGA. If your score is too low, ask how to improve it.

Urine Albumin (ACR):

Albumin is a type of protein made from the food you eat each day. Albumin should not be excreted in the urine. Having albumin in the urine is an abnormal finding. Having albumin in the urine for 3 months or more is kidney disease. Urine albumin can be measured in several ways. Two commonly used tests are:

- **Albumin-to-Creatinine Ratio (ACR):** This test compares the amount of albumin to the amount of creatinine in a single urine sample. When kidneys are healthy, the urine will contain large amounts of creatinine but almost no albumin. Even a small increase in the ratio of albumin to creatinine for 3 months or more is a sign of kidney damage.
- **Albumin-specific dipstick:** This test detects albumin in a single urine sample. Results can be positive or negative. A positive result indicates albumin and is abnormal. People with a positive dipstick result should have the ACR test.

Vitamin D:

Your body needs vitamin D so it can absorb calcium from food and have it go into your bones. Your kidneys help with this. They take the vitamin D that you get from sunlight and food, and turn it into an “active” form that your body can use. When your kidneys aren’t working well, they may not make enough active vitamin D to keep your bones healthy and strong.

Weight:

Maintaining a healthy weight is important to your overall health. A sudden weight gain or loss may also be a problem. You should check your weight at home every morning. Speak to your healthcare provider if your weight changes suddenly.

The **National Kidney Foundation** is the leading organization in the U.S. dedicated to the awareness, prevention, and treatment of kidney disease for hundreds of thousands of healthcare professionals, millions of patients and their families, and tens of millions of Americans at risk.

Help fight kidney disease.

Learn more at **www.kidney.org**



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Awareness. Prevention. Treatment.

