

# High Blood Pressure and Chronic Kidney Disease

For People with CKD Stages 1–4



National Kidney  
Foundation®

[www.kidney.org](http://www.kidney.org)

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KIDNEYS™**

## National Kidney Foundation's Kidney Disease Outcomes Quality Initiative

Did you know that the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-KDOQI)<sup>™</sup> has guidelines that help your doctor and healthcare team make important decisions about your medical treatment? The information in this booklet is based on the NKF-KDOQI recommended guidelines.

### What is your stage of kidney disease?

There are five stages of kidney disease. They are shown in the table below. Your doctor 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 level of kidney function. Your treatment is based on your stage of kidney disease. Speak to your doctor 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 doctor how much kidney function you have. As chronic kidney disease progresses, your GFR number decreases.

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## Did you know?

- More than half the people with chronic kidney disease (CKD) have high blood pressure.
- High blood pressure increases the chance that kidney disease will get worse.
- High blood pressure makes you more likely to develop heart disease.
- Following your treatment plan carefully and keeping your blood pressure under control can help to prevent these complications.
- Treatment for high blood pressure and CKD includes following a healthy diet, exercising and taking medications. Blood pressure should be controlled to less than 130/80 if you have CKD.

- If you have kidney disease from diabetes or if you have protein in your urine, the best blood pressure medications for your treatment are angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs).
- If you have CKD from diabetes or if you have protein in your urine, your doctor should prescribe an ACE inhibitor or an ARB for you, even if your blood pressure is normal.

This booklet will answer your questions about high blood pressure and kidney disease and tell you how to stay as healthy as possible when you have these conditions. This booklet is written for people who have high blood pressure and CKD in stages 1–4. If you do not know your stage of kidney disease, see the chart on the inside front cover of this booklet and speak to your doctor.

## **What is chronic kidney disease?**

Chronic kidney disease means the kidneys have been damaged by conditions, such as diabetes, high blood pressure or glomerulonephritis. As a result, the kidneys are less able to do the following jobs to help maintain health:

- Remove wastes and extra fluid from your body
- Release hormones that help to:
  - Control blood pressure
  - Promote strong bones
  - Prevent anemia by increasing the number of red blood cells in your body

- Keep the right balance of important chemicals in your blood, such as sodium, potassium, phosphorus and calcium
- Maintain the body's balance of acid and base.

When your kidneys are not working well, wastes can build to high levels in your blood and make you feel sick. Even before that, you may develop complications like high blood pressure, anemia (low blood count), weak bones, poor nutritional health and nerve damage. Kidney disease also makes you more likely to develop heart and blood vessel disease. These problems may happen slowly, over a long period of time, often without symptoms. CKD may eventually lead to kidney failure requiring dialysis or a kidney transplant to maintain life. Early detection and treatment can prevent or delay these complications.

### **What is high blood pressure?**

Blood pressure is the force of your blood against the walls of your blood vessels as your heart pumps blood around your body. If this pressure becomes too high, you are said to have high blood pressure, or hypertension.

## How are high blood pressure and kidney disease related?

They are related in two ways:

1. High blood pressure is a leading cause of CKD. Over time, high blood pressure can damage blood vessels throughout your body. This can reduce the blood supply to important organs like the kidneys. High blood pressure also damages the tiny filtering units in your kidneys. As a result, the kidneys may stop removing wastes and extra fluid from your blood. The extra fluid in your blood vessels may build up and raise blood pressure even more.
2. High blood pressure can also be a complication of CKD. Your kidneys play a key role in keeping your blood pressure in a healthy range. Diseased kidneys are less able to help regulate blood pressure. As a result, blood pressure increases.

If you have CKD, high blood pressure makes it more likely that your kidney disease will get worse and you will have heart problems. Following your treatment plan and keeping your blood pressure controlled can help keep your kidney disease from getting worse and prevent heart disease.

## How do I know if my blood pressure is too high?

The only way to tell if your blood pressure is too high is to have it measured. High blood pressure usually causes no symptoms. That is why it has been called a “silent killer.” A single high reading may not mean you have high blood pressure. It should be confirmed on follow-up visits to your doctor or clinic. Blood pressure is measured as two numbers. The top number, or systolic blood pressure, is the pressure when your heart is beating. The bottom number, or diastolic blood pressure, is the pressure when your heart is resting between beats. A blood pressure reading of 130/80 is read as 130 over 80.

Normal blood pressure in adults 18 and older is less than 120/80. People who have blood pressure between 120 and 139 for the top number, or between 80 and 89 for the bottom number, may be more likely to develop high blood pressure unless they take steps to prevent it. In general, blood pressure that stays at 140/90 or higher is considered high. However, for people who have diabetes or CKD, a blood pressure of 130/80 or higher is considered high.



## How is blood pressure measured? How often should it be checked?

Blood pressure is usually checked by using a blood pressure cuff around your arm. It should be checked every time you visit your doctor or clinic. You may also be taught to check your own blood pressure at home. Keep a record of your daily blood pressure and show this to your doctor at each visit.



## I have high blood pressure but am not sure if I have CKD. What should I do?

Everyone who has high blood pressure has an increased chance of developing CKD. You should ask your doctor about having the following tests:

- A blood test for creatinine, a waste product from muscle breakdown. This should be used to calculate your glomerular filtration rate, or GFR. Your GFR is a measure of your level of kidney function. If your GFR is too low, it may mean your kidneys are not able to remove enough wastes and extra fluid from your blood.
- A urine test for protein. Persistent protein in the urine is a sign of kidney damage. A higher urine protein means there is an increased chance your kidney disease may get worse and you may develop heart disease.
- A urine test to check for red blood cells and white blood cells.

## What tests will I need if I have CKD?

In addition to checking your GFR and urine protein, you should have the following:

- Diagnosis of the type of CKD you have. This may include an ultrasound to get a picture of your kidneys to check for any problems in size or structure or any blockages.
- Some tests to find out if you have an increased chance of developing heart and blood vessel disease, or if you already have heart problems. These tests will most likely include:
  - An electrocardiogram (EKG)
  - A blood test for glucose (sugar)
  - A blood test for lipids (fatty substances in your blood, such as cholesterol)
  - Height and weight measurement to find your body mass index (BMI). This tells if you are overweight.

Your doctor will also talk to you about:

- Any side effects or complications from your medications
- Any problems you may have in following your treatment plan.

## How often will I need to visit my doctor or clinic?

Once you are stable with your treatment, you may not need to visit your doctor or clinic as regularly. Your doctor will want to see you more often if:

- You start a new medication
- The dose of your medication is changed
- Your kidney disease is getting worse
- Your blood pressure is not controlled.

At follow-up visits, your doctor will check:

- Your blood pressure
- Your GFR
- Your urine protein level
- Your blood level of potassium. As kidney function decreases, potassium may build up to high levels in your blood. This can be dangerous for your heart. Some of the best medicines for treating high blood pressure and preventing further loss of kidney function can also make the potassium go higher. If your potassium level gets too high, you will need to make some changes in your diet (see "What kinds of changes will I need to make to my diet?" on pages 12–14).

## **What will my treatment for high blood pressure and CKD include?**

A treatment plan should be developed especially for you based on your stage of CKD. In some cases, your doctor may recommend that you see another doctor with special training in kidney disease or high blood pressure. This doctor will help to develop your treatment plan. The goals of your treatment are:

- To lower your blood pressure to less than 130/80
- To keep kidney disease from getting worse
- To lower your chance of getting heart disease.

To help reach these goals, you will need a combination of lifestyle changes, such as following a healthier diet and exercising more, and taking medications.

## **What kinds of changes will I need to make to my diet?**

That will depend on your stage of CKD. In stages 1–2, your doctor may recommend that you follow a diet that is high in fruits, vegetables and dairy foods, such as the DASH (Diet Approaches to Stop Hypertension). This diet is low in sugar and sodium. If you have any questions about your diet, speak to your doctor. Your doctor can refer you to a registered dietitian who will help you work out a diet plan to meet your needs.

People with CKD in stages 1–4 may also be asked to make the following changes:

- Cut back on sodium (found in large amounts in table salt and foods with added salt). You should not have more than 2,400 milligrams of sodium each day.
- Cut down on foods that are high in saturated fats and cholesterol. These can clog up your arteries and increase your risk for heart and blood vessel disease.
- Control the amount of carbohydrates in your diet. Carbohydrates should only account for 50 percent to 60 percent of your daily calories. Carbohydrates are foods that turn to sugar when you digest them. They are found in many foods, such as bread, rolls, tortillas, rice, pasta, potatoes, corn, dried beans, fruits and fruit juices, milk and yogurt.



If you have CKD in stages 3–4, you may be asked to make some additional changes to keep CKD from getting worse and to prevent complications such as bone disease. You may need to:

- Control the amount of protein you eat. Ask your doctor how much protein you need each day. Your dietitian can help you plan your meals to get the right amount of protein to meet your needs.
- Eat fewer foods that are high in phosphorus. High levels of phosphorus in your blood may lead to bone disease. Phosphorus is found in large amounts in dairy products like milk, cheese, pudding, yogurt and ice cream; in nuts and peanut butter; and in beverages like cocoa, beer and dark cola drinks.
- Reduce the amount of potassium in your diet. Your doctor will check the amount of potassium in your blood. Ask your doctor if your potassium level is too high. If it is, you will need to reduce your intake of potassium-rich foods. Your dietitian can teach you which foods are high and low in potassium and help you plan your meals to get the right amount.



## Will I need to make other changes in my lifestyle?

Yes. The following steps can also help you reach your treatment goals:

- Lose weight if you are overweight.
- Exercise at a moderate level for 30 minutes a day on most days of the week. Always check with your doctor before starting an exercise program.
- Cut back on alcohol (no more than two drinks a day for men and one drink a day for women).
- Stop smoking if you are a smoker.

## What about medications?

Your target blood pressure is below 130/80. To reach this goal, you will probably need more than one type of blood pressure pill. Your medications may include:

- An angiotensin converting enzyme (ACE) inhibitor or an angiotensin receptor blocker (ARB). Studies have shown that these help to protect your kidney function and lower your risk for heart disease.
- A diuretic or water pill.
- Other medications, such as beta blockers or calcium channel blockers, to help reach your treatment goals.

Be sure to take your medications exactly as prescribed by your doctor. Report any side effects to your doctor right away. It may be possible to lower your dose or



switch you to another medication. Do not stop taking any of your medications on your own without letting your doctor know and following up to check your blood pressure. Even though you are feeling well, uncontrolled high blood pressure could still damage vital organs like the heart and kidneys. Remember, high blood pressure is a silent killer.

### **What if I have CKD and diabetes?**

Controlling your blood sugar and blood pressure are the most important things you can do to keep kidney disease from getting worse and to prevent other complications. Be sure to make the lifestyle changes recommended by your doctor and take your medications exactly as prescribed. If you have diabetes and CKD, an ACE inhibitor or ARB will be part of your treatment plan, even if your blood pressure is below 130/80. This is because these medications help to protect your kidney function.

### **What if I have a kidney transplant?**

Many kidney transplant recipients have high blood pressure and CKD. It's very important to reduce your blood pressure to less than 130/80 in order to keep your kidney transplant working well. If you have high blood pressure, be sure to follow the lifestyle changes recommended by your doctor and to take your blood pressure medications exactly as prescribed.



## What can I do to help control my blood pressure?

You can do a lot.

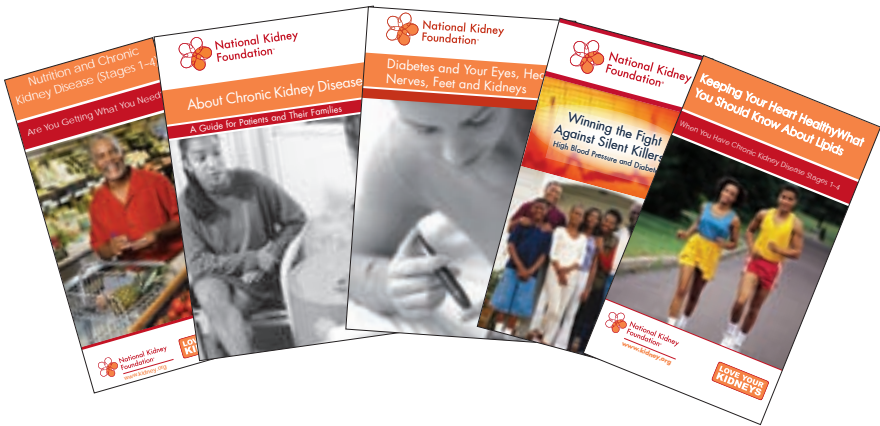
- Be sure to keep all your scheduled appointments with your doctor.
- Ask your doctor how you can learn to take your own blood pressure at home. Keep a record of your daily blood pressure and show this to your doctor at each visit.
- Take your blood pressure pills exactly as prescribed by your doctor, even if you are feeling fine. High blood pressure usually causes no symptoms.
- Report any side effects from your medicine to your doctor. Never stop taking any of your medications on your own.
- To help you remember when to take your medications, try one of the special pill boxes with small compartments labeled with the days of the week as well as the time of day. Watches with alarms may also be helpful. Ask your family members to help remind you to take your medications.
- Follow your diet and exercise plan faithfully. If you need help with your diet, ask your doctor to refer you to a registered dietitian. The dietitian will explain the diet to you and help you develop a meal plan you can live with.
- Learn all you can about your treatment. Don't be afraid to ask questions if there is something you don't understand. Bring a list of your questions when you go to the doctor.

## What can my family do?

It's a good idea to get your whole family involved in your care. It's much easier to make lifestyle changes, such as following a healthier diet, exercising more and stopping smoking, if you take these steps together or if you have the support of your family. Because high blood pressure often runs in families, some of your family members may also be at increased risk of developing high blood pressure and CKD. You should encourage them to learn all they can about high blood pressure and to have their blood pressure checked at least once a year. A family history of high blood pressure and CKD increases their risk of developing these conditions too.



## Where can I get more information?



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

If you want to read more about kidney disease, the National Kidney Foundation has more than 50 other publications that cover many subjects, such as:

- CKD risk factors like hypertension and diabetes
- Complications of chronic kidney disease, such as cardiovascular disease, anemia or bone problems
- Nutrition for CKD patients, information about carbohydrates, protein, sodium, phosphorus and potassium
- Treating kidney disease early
- Treating kidney failure with transplantation or dialysis.

There are two ways to learn about the many free resources available to you:

- Call the National Kidney Foundation at 800.622.9010.
- Visit the National Kidney Foundation website ([www.kidney.org/store](http://www.kidney.org/store)). (All publications are free, but there is a limit of five per person.)

Becoming an educated patient is very important to being healthy!

### **Key points to remember**

- High blood pressure and kidney disease are closely related. High blood pressure is both a cause and a complication of kidney disease.
- Having high blood pressure increases the chance that kidney disease will get worse and that heart problems will develop.
- Keeping blood pressure well-controlled reduces the chance of these complications.
- High blood pressure usually causes no symptoms. The only way to find out if your blood pressure is too high is to have it measured. Your blood pressure should be checked at every visit to your doctor or clinic.

- If you have CKD, your doctor should also test your blood to check your kidney function (GFR) and levels of other chemicals in your blood such as potassium. Your urine will be checked for protein, a sign of kidney problems.
- Your treatment will include making changes to a healthier lifestyle and taking medications.
- Your treatment goals are: to lower your blood pressure to less than 130/80; to keep kidney disease from getting worse; and to reduce your chance of developing heart disease.
- You will probably need more than one type of high blood pressure pill to reach your target. These may include: a diuretic or water pill, an ACE inhibitor or ARB to protect kidney function and other medications to help you reach your target blood pressure.
- Report any problems to your doctor. Never stop taking a medication without speaking to your doctor.
- Learn all you can about high blood pressure and CKD. Get involved in your own care.
- Encourage family members to have their blood pressure checked. They may also be at increased risk for high blood pressure and CKD.

## Test Your Knowledge: Take This True or False Quiz.

1. High blood pressure increases the chance that kidney disease will get worse.  
True \_\_\_\_ False \_\_\_\_
2. High blood pressure may be a complication of kidney disease.  
True \_\_\_\_ False \_\_\_\_
3. High blood pressure causes many symptoms.  
True \_\_\_\_ False \_\_\_\_
4. The treatment for high blood pressure includes lifestyle changes and medications.  
True \_\_\_\_ False \_\_\_\_
5. Usually, one medication is enough to control high blood pressure in people with CKD.  
True \_\_\_\_ False \_\_\_\_
6. Getting regular exercise may help reduce your blood pressure.  
True \_\_\_\_ False \_\_\_\_
7. If you have high blood pressure, you may need to increase sodium in your diet.  
True \_\_\_\_ False \_\_\_\_
8. If you have kidney disease, you are also at increased risk for heart disease.  
True \_\_\_\_ False \_\_\_\_
9. The blood pressure goal for people with kidney disease or diabetes is less than 140/90.  
True \_\_\_\_ False \_\_\_\_
10. You should never check your own blood pressure.  
True \_\_\_\_ False \_\_\_\_

See answers on page 23.



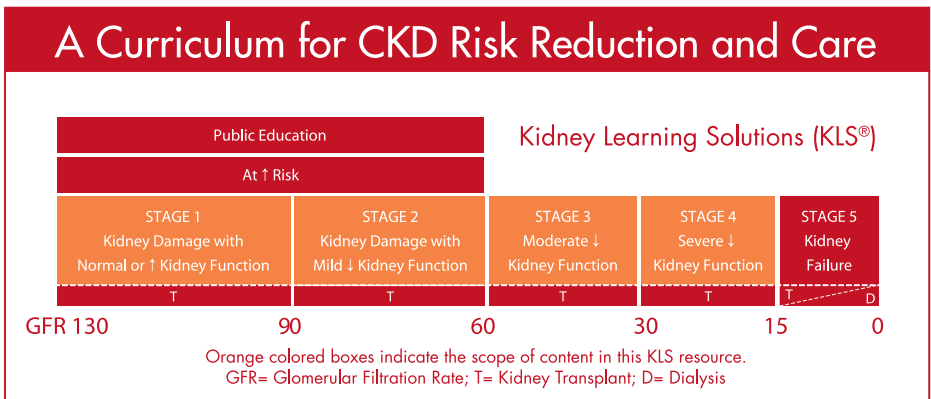
## National Kidney Foundation

The National Kidney Foundation (NKF) is dedicated to preventing kidney diseases, improving the health and well-being of individuals and families affected by these diseases and increasing the availability of all organs for transplantation.

With local offices nationwide, the NKF provides early detection screenings and other vital patient and community services. The Foundation conducts extensive public and professional education, advocates for patients through legislative action, promotes organ donation and supports kidney research to identify new treatments.

In 2009 NKF launched a groundbreaking multifaceted collaborative initiative to “**END THE WAIT!**” for a kidney transplant in the United States in 10 years by using proven strategies to eliminate barriers to donation and institute best practices across the country.

The NKF relies on individual and corporate donations, foundation and government grants, membership and special events to support its range of programs, services and initiatives.



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