

DIABETES AND CHRONIC KIDNEY DISEASE

Stages 1–4



National
Kidney
Foundation™

www.kidney.org

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™) has guidelines and commentaries 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 and commentaries.

What is your stage of kidney disease?

There are 5 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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What is diabetes?

Diabetes is a serious disease. It occurs when your body does not make enough insulin or cannot use the insulin it makes. Insulin is a hormone. It controls the amount of sugar (called glucose) in your blood. A high blood sugar level can cause problems in many parts of your body.

Are there different types of diabetes?

Yes. There are two main types:

- **Type 1 diabetes**

If you have this type of diabetes, your body does not make insulin. It usually starts when you are a child or young adult, but it can occur at any age. It is treated by taking daily insulin shots or using an insulin pump and by following a special meal plan. About 5 to 10 percent of diabetes cases are type 1.

- **Type 2 diabetes**

If you have this type of diabetes, your body makes some insulin but cannot use it properly. Type 2 is partially preventable and is typically brought on by poor diet and lack of exercise. Very often heredity plays a part. It usually starts when you are over age 40, but it can happen earlier. It is treated with exercise, weight loss, and special meal planning. People with type 2 diabetes may need insulin, but in most cases medications given in pills (called hypoglycemics) are prescribed if diet and exercise alone do not control the disease. Type 2 is the most common type of diabetes.

How does diabetes affect my body?

When diabetes is not well controlled, the sugar level in your blood goes up. This is called *hyperglycemia*. High blood sugar can cause damage to many parts of your body, especially:

- kidneys
- heart
- blood vessels
- eyes
- feet
- nerves

Diabetes can also cause high blood pressure and hardening of the arteries (called arteriosclerosis). These can lead to heart and blood vessel disease.



What is chronic kidney disease?

Your kidneys are important because they keep the rest of your body in balance. They:

- Remove waste products from the body
- Balance the body's fluids
- Help keep blood pressure under control
- Keep bones healthy
- Help make red blood cells.

Chronic kidney disease (CKD) means that the kidneys have been damaged. Kidneys can get damaged from a physical injury or a disease like diabetes or high blood pressure. Once your kidneys are damaged, they cannot filter your blood or do other jobs as well as they should. There are five stages of kidney disease (see page 10). Treatment in the early stages can help keep kidney disease from getting worse.

Are people with diabetes at greater risk for getting kidney disease?

Yes. About a third of people with diabetes may get chronic kidney disease. Certain groups may have a higher risk of getting kidney disease than others. Your risk may be greater if you:

- Are age 60 or older
- Have high blood pressure
- Have a family member who has kidney failure
- Are African American, Hispanic, Asian, Pacific Islander or American Indian.

What can people with diabetes do to prevent kidney disease?

Many people with diabetes do not get kidney disease or kidney failure. Talk to your doctor about your chances of getting kidney disease. The best way to prevent getting kidney disease from diabetes is to:

- Control your blood sugar level
- Keep blood pressure under control
- Ask your doctor to test you for kidney disease at least once each year
- Take medicines to help control your blood glucose, cholesterol, and blood pressure if your doctor orders them for you
- Follow your diet for diabetes
- Get regular exercise
- Avoid alcohol
- Do not smoke
- See your doctor as often as you are told

How does diabetes harm the kidneys?

Diabetes can harm the kidneys by causing damage to:

- **Blood vessels in the kidneys**

The filtering units of the kidney are filled with tiny blood vessels. Over time, high sugar levels in the blood can cause these vessels to become narrow and clogged. Without enough blood, the kidneys become damaged and albumin (a type of protein) passes through these filters and ends up in the urine where it should not be.



- **Nerves in your body**

Diabetes can also cause damage to the nerves in your body. Nerves carry messages between your brain and all other parts of your body, including your bladder. They let your brain know when your bladder is full. But if the nerves of the bladder are damaged, you may not be able to feel when your bladder is full. The pressure from a full bladder can damage your kidneys.

- **Urinary tract**

If urine stays in your bladder for a long time, you may get a urinary tract infection. This is because of bacteria. Bacteria are tiny organisms like germs that can cause disease. They grow rapidly in urine with a high sugar level. Most often these infections affect the bladder, but they can sometimes spread to the kidneys.

How do I know if I have kidney damage?

Most people with early kidney damage do not have symptoms. The best way to find early kidney damage is to have a **urine test** once a year. This test checks for very small amounts of protein in the urine called microalbuminuria. It helps show kidney damage at an early stage in people with diabetes.

Not everyone with kidney disease gets kidney failure. With the right treatment, you can prevent kidney disease from getting worse.

If I have kidney damage, what can be done?

First, your doctor needs to find out how well your kidneys are working. This will help in determining the best treatment for you. Your doctor will start by:

- **Determining your GFR (glomerular filtration rate)**

GFR is the best way to find out how well your kidneys are working. Your doctor will begin by testing your blood for a waste product called creatinine. When the kidneys are damaged, they have trouble removing creatinine from your blood. Creatinine is stored in muscle tissue and blood. The blood test for creatinine will help your doctor find out how well your kidneys are working. But it is only the first step.

Next, your doctor or lab will take the result of this test and put it into a math formula that includes your age, race, and sex. The number that results from this math formula is called your GFR (glomerular filtration rate). It tells your doctor how well your kidneys are working. You should have this test at least once a year.

Once your GFR is known, your doctor can tell which stage of kidney disease you have. There are five stages of kidney disease (see the chart below). Your treatment will depend on your stage of kidney disease.

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● **Ordering a kidney biopsy if needed**

Your doctor may also order a kidney biopsy. This can help your doctor find the main cause of your kidney disease. Not all kidney damage is caused by diabetes. Other diseases can be involved. If your kidney disease is caused by diabetes, it is called diabetic kidney disease.

Your doctor will begin treatment based on the stage of kidney disease you have and what caused it. With the right treatment, you and your doctor can keep your kidneys working as long as possible.

What can be done to keep my kidneys working as long as possible?

Your doctor should plan your treatment with you and your family. Some patients may be asked to see a kidney doctor, called a nephrologist. A dietitian may be helpful too.

The following things can help your kidneys work better and last longer:

- **Controlling your blood sugar**

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 hypoglycemic pills (to lower your blood sugar level). A test called hemoglobin A1C should be done every three to six months to check your average blood sugar. Ask your doctor what your test result should be. Daily blood sugar levels should also be checked so that your medication doses can be adjusted as needed.

- **Controlling high blood pressure**

High blood pressure can increase your chances of getting kidney failure. Ask your doctor what your blood pressure target should be. You will probably need a medication called an ACE (angiotensin converting enzyme) inhibitor or an ARB (angiotensin receptor blocker) to control your blood pressure. In many cases, more than one high blood pressure medicine may be needed to reach this target. Studies have shown that the use of these medicines can slow the loss of kidney function in all people with diabetes—even if your blood pressure is normal. They also help reduce heart disease in people with diabetes. In addition, your doctor may prescribe a diuretic (water pill) to help remove salt and water from your blood.

- Protecting kidney function by taking ACE inhibitors or ARBs**
 Your doctor may have you 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 all people with diabetes—even those with normal blood pressure.
- Limiting how much protein you eat**
 People with diabetes and kidney disease should eat enough protein for good health, but avoid overeating it. Research suggests that eating less protein can slow kidney damage. You should talk to your doctor about this. If you need to go on a low-protein diet, you must plan this with a dietitian who specializes in kidney disease. Do not go on this type of diet without talking to a dietitian so that you have a healthy approach to dietary changes.
- Promptly reporting to your doctor any difficulty passing urine**
 Early treatment for urinary tract infections is important. Some signs of urinary infection could be: frequent need to urinate, burning or pain with urination, cloudy or blood-spotted urine, or a strong odor to your urine.
- Limiting the amount of salt in your diet** to help control high blood pressure and reduce body swelling
- Not using medicines that may damage the kidneys** especially NSAIDs (Non-Steroidal Anti-Inflammatory Drugs) such as ibuprofen and naproxen
- Checking with your doctor** before taking any herbal supplements
- Preventing further damage to larger blood vessels** (such as those in the brain and heart) by keeping cholesterol and lipid levels under control.

What about cholesterol and lipids?

Many people with diabetes and kidney disease have high levels of lipids in the blood. Lipids are fatty substances like cholesterol. High blood lipid levels can cause the blood vessels to become clogged. This lessens the blood supply to the heart and brain, and raises your chance of having a heart attack or stroke. Your doctor will check your cholesterol and lipids at least once a year. If they are too high, you may need drugs called statins to help lower them.

What about pregnancy?

Having both diabetes and kidney disease is serious. It can affect your health and the health of your unborn child. If you are thinking about becoming pregnant, talk to your healthcare team. If you become pregnant, you should be under the care of a specialist in high-risk pregnancy and a specialist in kidney disease. Some women may also have a higher risk for kidney failure during pregnancy. You should:

- Keep your blood sugar levels under control
- Ask your doctor about using insulin to control your blood sugar while pregnant
- Tell your doctor about any medicines you are taking, especially medicines for high blood pressure or cholesterol.

With good healthcare and careful blood sugar control, it is possible to have a healthy pregnancy.

Key points to remember

- About a third of people with diabetes may develop kidney failure.
- Because diabetes may harm the blood vessels in the body, it can cause kidney damage.
- Early kidney damage from diabetes can be found by a test that checks for a tiny amount of protein (called microalbuminuria) in the urine. A test called GFR tells your doctor how much kidney function you have.
- Treatment with some high blood pressure medicines called ACE inhibitors or ARBs can slow the loss of kidney function in people with diabetes, even in people with normal blood pressure.



- Reducing the amount of sodium (salt) in your diet may be needed if there is kidney damage or high blood pressure. The most common form of sodium is found in table salt.
- Other things that can cause kidney damage and affect kidney function are: blocking of urine flow, urinary tract infection and certain medicines (especially NSAIDs such as ibuprofen and naproxen).
- Early kidney disease rarely has symptoms. That is why it is so important to be tested regularly by your doctor for kidney damage. An early sign of kidney damage is protein in the urine.
- If chronic kidney disease causes kidney failure, you will need hemodialysis, peritoneal dialysis or a kidney transplant to replace the work of your kidneys. The type of treatment that is best depends on overall health, lifestyle and personal preference.
- Diet is a very important part of the treatment of all patients with diabetes even if they do not have chronic kidney disease.

Diabetes: A growing epidemic

Did you know these facts about diabetes?

- Nearly 26 million people in the United States (about 8 percent of the population) have diabetes, and about a third do not even know they have the disease.
- Diabetes is the leading cause of chronic kidney disease.
- Diabetes accounts for 44 percent of kidney failure.
- Worldwide, 347 million people have diabetes.
- At least 27 percent of people older than 65 years have diabetes.

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 high blood pressure and diabetes
- Complications of chronic kidney disease, such as cardiovascular disease, anemia or bone problems
- Nutrition for CKD patients, with 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 NKF Cares Patient Patient Information Help Line toll-free at **855.NKF.CARES** (855.653.2273) or email **nkfcares@kidney.org**
- Learn more at **www.kidney.org**

Becoming an educated patient is very important to being healthy!

You may also want to contact:

American Association of Diabetes Educators
100 W. Monroe
Suite 400
Chicago, IL 60603
800.338.3633
www.diabeteseducator.org

American Diabetes Association
ATTN: National Call Center
1701 North Beauregard Street
Alexandria, VA 22311
800.342.2383
www.diabetes.org

Questions for my doctor

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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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