

DIABETES

*Eyes, Heart, Nerves,
Feet, and Kidneys*



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 is diabetes?

Diabetes is a serious disease. It happens when the body does not make enough insulin or cannot use the insulin it makes. Insulin is a hormone. It controls how much sugar is in your blood (called “glucose”). Hormones are secretions that your body makes to help your body work and stay healthy.

Insulin also helps the sugar in your blood move into cells for energy. Without enough insulin, your cells are starved of energy and sugar builds up in your blood. Over time, this can lead to:

- Kidney disease
- Heart attack
- Heart disease
- High blood pressure
- Stroke
- Eye damage
- Foot problems that can lead to amputation

Do you know these words?

Some words that are used in this booklet may be new to you. To help you get to know them, there's a list of "Words to Know" at the end of this booklet. (See page 19.)

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 enough insulin. It usually appears when you are a child or young adult, but it can happen at any age.

Type 2 diabetes: If you have this type of diabetes, your body makes insulin but cannot use what it makes. It is often brought on by a bad diet and lack of exercise. Type 2 usually starts when you are over age

Tip

If you have diabetes, you must take special care of yourself. Otherwise, you can develop serious health problems.

40, but it can happen earlier. It is the most common type of diabetes and it often runs in families.

How do health problems from diabetes begin?

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 very small blood vessels in your body. Imagine what happens to sugar when it is left unwrapped overnight. It gets sticky. Now imagine how sugar “sticks” to your small blood vessels and makes it hard for blood to get to your organs.

Damage to blood vessels occurs most often in the eyes, heart, nerves, feet, and kidneys. Let’s look at how this damage happens:

- **Eyes**

Your eyes have tiny blood vessels. Having high levels of sugar in your blood for a long time can harm these tiny blood vessels. Some blood vessels may swell and weaken. Some may become clogged and not let enough blood through. This can result in vision problems or blindness. High blood pressure can also make

eye problems worse. Eye damage caused by diabetes is called “diabetic retinopathy.”

- **Heart**

High blood sugar may also harm larger blood vessels in your body that supply oxygen to your heart and brain.

Fat can build up in the blood vessels as well. These fatty deposits can break apart, causing blood clots and blocking the blood vessels. This can lead to a heart attack or stroke. In fact, 2 out of 3 people with diabetes die from heart disease or stroke.

People with diabetes are also at higher risk for heart failure, a condition in which the heart cannot pump blood properly.

- **Nerves**

Nerves carry messages between your brain and other parts of your body. They tell your body what you see or feel. For example, if you step on something sharp, a nerve in your foot will send a pain signal to your brain. Having high levels of sugar in your blood for many years can damage the blood

vessels that bring oxygen to some nerves. Damaged nerves may stop sending messages. Or they may send messages too slowly or at the wrong times. Nerve damage that is caused by diabetes is called "diabetic neuropathy."

- **Feet**

Diabetes can harm your feet in two ways. First, it can damage your body's nerves. Nerve damage stops you from feeling pain or other problems in your feet. Another way that diabetes can cause damage to your feet is from poor blood circulation. Poor blood flow makes it hard for a sore or infection to heal. If sores don't heal and get infected, it can lead to amputation.



- **Kidneys**

Think of your kidneys like a coffee filter. When you make coffee, the filter keeps the coffee grains inside, but allows water to pass through it. Your kidneys do something similar. They keep the things you need inside your body, but filter out wastes and extra fluid.

Your kidneys are filled with tiny blood vessels. Over time, high blood sugar can cause these blood vessels to get narrow and clogged. As your kidneys get less blood, less waste and fluid is taken out of your body. Kidney disease that is caused by diabetes is called “diabetic kidney disease.” It is the number one cause of kidney failure in the United States.

How serious is kidney disease?

Having kidney disease is very serious—even without diabetes. Without treatment, it can lead to:

- **Heart and blood vessel disease**

Heart disease is common in people with kidney disease. In fact, most people with kidney disease do not die from kidney failure — they die from heart disease.

- **High blood pressure**

Your kidneys help control blood pressure. But once your kidneys are damaged, they may not be able to do that very well. High blood pressure can lead to heart failure, heart attacks, and strokes.

- **Anemia**

Anemia means your body does not have enough red blood cells. Your kidneys help your body make red blood cells. Red blood cells are important. They carry oxygen from your lungs to all parts of your body. But once your kidneys are damaged, they may not be able to do that very well. Most people with kidney disease get anemia.

- **Mineral and bone disorder**

Kidney disease causes your bones to lose calcium. Your bones can become weak over time and break easily. Some calcium may end up in parts of your body where it does not belong, like your heart and blood vessels. This can lead to heart disease. It can also lead to amputations. Most people with kidney disease will get mineral and bone disorder.

- **Kidney failure**

Your kidneys filter wastes from your blood and manage other functions of your body. There are five stages of kidney disease. Treatment in the early stages can help keep kidney disease from getting worse. If your kidneys fail, you will need treatment with dialysis for the rest of your life, or a kidney transplant. Without treatment, you will die.

To learn more about dialysis or a kidney transplant, call the NKF Cares Patient Help Line toll-free at **855.NKF.CARES** (855.653.2273) or email **nkfcares@kidney.org**.

- **Early death**

Kidney disease can lead to early death. But treatment can help keep kidney disease from getting worse. If you have diabetes, your healthcare provider should check you for kidney disease at least once a year.

- **Serious problems from diabetes**

Having kidney disease makes your diabetes worse. You are more likely to develop heart disease, stroke, blindness, nerve damage, and foot amputations from diabetes if you also have kidney disease.

How do I know if I have kidney disease?

Kidney damage can cause protein to leak into your urine. This protein is called "albumin." Your healthcare provider can test your urine for albumin. This test helps find kidney damage at an early stage in people with diabetes. You should have this simple urine test at least once a year.

What happens if I have kidney damage?

Your healthcare provider will create a special treatment plan for you. This may include taking medicines, reducing sodium (salt), limiting certain foods, getting exercise, and more.

You will also need regular checkups to monitor your kidney function. This is done with a simple blood test to estimate your GFR (glomerular filtration rate). Your GFR number shows how well your kidneys are working. It helps your healthcare provider create a treatment plan for you. (See page 2.)

Having kidney disease or diabetes does not mean your kidneys will fail. Finding and treating it early can help keep kidney disease from getting worse.

Tip

Controlling blood sugar can help keep your kidney disease from getting worse. Several major medical studies have shown that keeping blood sugar in the normal range can slow the progression of kidney disease.

How can I prevent kidney disease and other problems from diabetes?

Controlling blood sugar is the best way to protect your eyes, heart, nerves, feet, and kidneys. It lowers your risk for all health problems from diabetes. This is true for all people with diabetes—with or without kidney damage.



How is blood sugar controlled?

This depends on the type of diabetes you have.

- **Type 1 diabetes**

Blood sugar is usually controlled by taking insulin (shots or injections), and by following a meal plan.

- **Type 2 diabetes**

Diet and exercise are used to control blood sugar. If diet and exercise are not enough, insulin or other medicines that lower blood sugar may be used. These medicines are called “hypoglycemics.” There are several types. Some work by helping your body make insulin. Some help your body respond to insulin. Others help your body absorb sugar more slowly.

How often should I check my blood sugar?

You should check your blood sugar level as often as your healthcare provider recommends. There are two ways to do this.

- **Blood glucose meter**

This is a simple test that you can do at home. It is usually done several times a day. This test tells you what your blood sugar is at any moment of the day.

- **A1C test**

This blood test tells you what your average blood sugar levels have been for the past 2 to 3 months. Along with daily blood sugar tests that you do at home, the A1C test helps you and your healthcare provider decide if your diabetes is under control. You should have an A1C test every 3 months. Ask your healthcare provider what your A1C number should be, and try to stay at that goal.

Tip

Ask your healthcare provider what you need to do to control your blood sugar. Ask what your A1C number should be, and try to stay on your goal. Learn all you can about keeping your blood sugar under control.

What else can I do to protect my eyes, heart, nerves, feet, and kidneys from diabetes?

- Work with your healthcare team to develop a treatment plan that helps you manage diabetes.
- Get regular exercise.
- Keep body weight under control.
- Speak to a dietitian who can help you create a meal plan that includes healthy food choices. Eating wisely will help you control blood sugar, blood pressure, and cholesterol. Cholesterol is a fat-like substance found in blood. It can increase your chance for heart disease.
- Take prescribed medicines to help control your blood glucose, blood pressure, and cholesterol. If it is hard for you to manage all your different medicines, talk with your pharmacist for helpful ideas.

- Get regular checkups for your eyes. If found early, eye problems from diabetes can be slowed or stopped.
- Get regular checkups for your feet. Be sure to wear shoes that fit properly and check your feet every day for injuries, blisters, or redness.
- If you smoke, ask your healthcare provider about a plan to help you quit. If you don't smoke, don't start.



Where can I get more information?

If you have questions, ask your healthcare provider. You can also call the NKF Cares Patient Help Line toll-free at **855.NKF.CARES** (855.653.2273) or email **nkfcares@kidney.org**. A trained professional will listen to your concerns and help answer your questions.

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

- General information about kidneys, including what they do and why they are important
- Risk factors for kidney disease
- Complications of kidney disease, including blood pressure, diabetes, anemia, cholesterol problems, bone and mineral problems, and heart problems
- Nutrition and kidney disease
- Treatments for kidney disease and kidney failure, including hemodialysis, peritoneal dialysis, and kidney transplant

You may also want to contact:

**American Association of
Diabetes Educators**

100 W. Monroe Street, Suite 800
Chicago, IL 60603
800.338.3633 ext. 4878
www.diabeteseducator.org

Amputee Coalition of America

9303 Center Street, Suite 100
Manassas, VA 20110
888.267.5669
www.amputee-coalition.org

National Federation of the Blind

200 East Wells Street
Baltimore, MD 21230
410.659.9314
www.nfb.org

**National Kidney Disease
Education Program**

3 Kidney Information Way
Bethesda, MD 20892
Toll free: 1.866.454.3639
nkdep@info.niddk.nih.gov

The Mended Hearts, Inc.

8150 N. Central Expressway, M2248
Dallas, TX 75206
888.432.7899
www.mendedhearts.org

Words to Know

Albumin: A type of protein. A simple urine test for albumin can help find kidney disease at an early stage.

Anemia: A decrease in the number of your red blood cells. Anemia can make you feel very tired and have other bad effects.

A1C test: A blood test that measures your average blood sugar level over the past two to three months.

Diabetes: A disorder in which the body either cannot make insulin or cannot use it properly. Insulin is a hormone that controls how much sugar is in your blood.

Dialysis: A process that filters waste products and extra fluid from your blood when your kidneys are no longer doing their job. It is one of the basic forms of treatment for kidney failure.

GFR (glomerular filtration rate): An estimate of kidney function. GFR can be calculated from your blood creatinine level, age, sex, and race.

Glucose: A simple sugar that gives your body its primary source of energy.

Heart attack: Damage to part of the heart muscle. A heart attack can happen if oxygen is blocked from reaching a part of the heart muscle.

Heart failure: When the heart cannot pump well enough to move blood and fluids through the body.

High blood pressure: The force of blood against the wall of your blood vessels. High blood pressure means the force is consistently higher than what is healthy.

Hormones: Chemical messengers produced by many different glands in your body—including the kidneys—to trigger certain responses in your body.

Hyperglycemia: Having too much sugar in the blood.

Insulin: A hormone that controls how much sugar is in your blood.

Kidney disease: The loss of some or all of your kidney function. Kidney disease can result from conditions such as high blood pressure, diabetes, or an injury to the kidneys.

Kidney failure: The stage of kidney disease at which dialysis or a transplant is needed to stay alive.

Kidney transplant: An operation that places a healthy kidney in your body. It is one of the basic forms of treatment for kidney failure.

Mineral and bone disorder: Kidney disease can cause important minerals in your bloodstream, such as calcium and phosphorus, to get out of balance. As a result, bones may lose calcium and become weak over time.

Stroke: Brain damage caused by a blocked blood vessel or bleeding in the brain.

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.
