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Diabetes and Your Kidneys

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Diabetes: The #1 Cause of Kidney Failure

Your doctor told you that you have diabetes. You may have a lot of questions. This guide can help.

You will learn:

- What diabetes is
- How diabetes can harm kidneys
- Tests you may need
- What to ask your doctor
- Tips to stay healthy
- Where to learn more

While reading this guide, you will see words in **bold**. These words and their meetings can be found in the glossary starting on page 17.

Even after reading this guide, you may still have questions. Write down any questions that you have on pages 26 and 27 and take this guide with you to your next doctor visit.

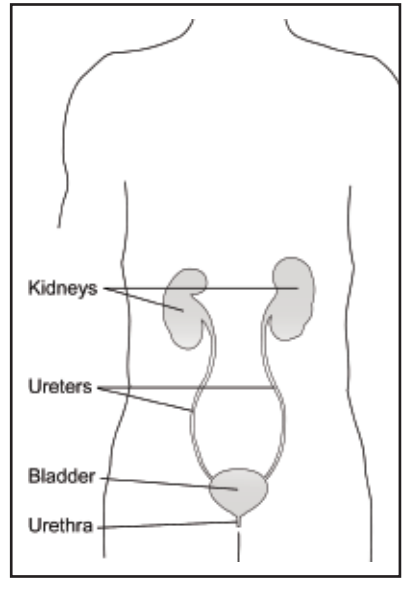
What is diabetes?

Diabetes (sometimes called "sugar") means that your body has problems with a hormone called **insulin**. Insulin helps your body use the sugar you eat (also called **glucose**) for energy. When your body doesn't use insulin the way it should, too much sugar stays in your blood. Too much sugar in your blood can harm your body.

What do my kidneys do?

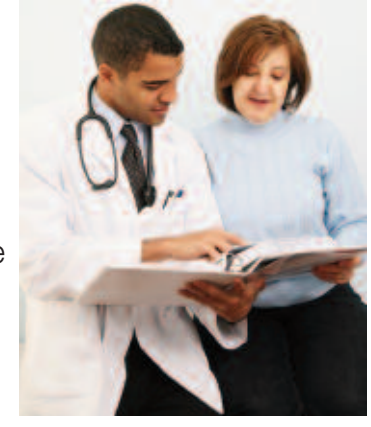
Your kidneys clean waste and extra fluid from your blood. This makes up your urine (pee). They also do many other jobs that you need in order to live. Your kidneys:

- Balance chemicals in your body
- Help control your **blood pressure**
- Help keep your bones healthy
- Help make red blood cells



How can diabetes hurt my kidneys?

Diabetes is the #1 cause of kidney failure. The filters in your kidneys are full of tiny blood vessels (called **glomeruli**). High blood sugar can harm these tiny blood vessels. When this happens, it is called diabetic **kidney disease** (or **diabetic nephropathy**).



Once the kidneys are harmed like this, they can't be fixed. If diabetic kidney disease is not treated early, it can lead to **kidney failure**. Kidney failure means that the kidneys don't work well enough to clean your blood. There is no cure for kidney failure. If you have kidney failure, you will need **dialysis** or a kidney **transplant** to live.

The good news is that diabetic kidney disease does not happen fast. Sometimes it takes many years. This means you can help protect your kidneys. Even if your kidneys are already damaged, you can control your diabetes to help keep them from getting worse.

Important!

You will not be able to feel if diabetes has harmed your kidneys. The only way to know is to be tested. Your doctor can do a few simple tests to check how well your kidneys are working. Keep reading to learn more!

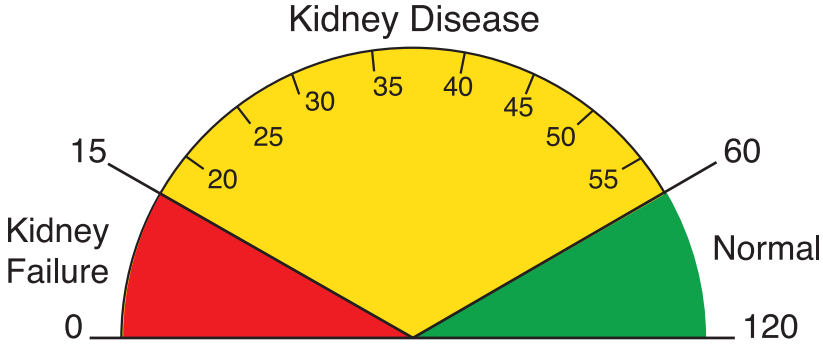
What are the tests for kidney disease?

Your doctor can check your kidneys by doing a simple blood test and a urine test.

eGFR – The **estimated Glomerular Filtration Rate (eGFR)** is a number based on your blood test for **creatinine**. It tells how well your kidneys are working.

Your doctor will test your blood for creatinine. Creatinine is a waste that comes from your muscles. Your doctor will use the result from your creatinine test, your age, your sex and your race to calculate your eGFR.

Use the scale below to see what your eGFR may mean: [1]



Use the chart on page 24 to track your eGFR result.

The eGFR is a good test, but it's not for everyone. For example, this test may not be accurate if you are younger than 18, pregnant, very overweight or very muscular. Talk to your doctor to find out if this test is right for you.

Urine Test – If your kidneys are damaged, they may let protein leak into your urine. One test your doctor may suggest checks for protein in your urine. Protein in your urine (called **proteinuria**) can be an early sign of kidney disease. People with diabetes should have a urine test at least once a year.[2]

Another type of urine test that your doctor may do tells how much protein is in your urine. This test is called a **urine albumin-to-creatinine ratio (UACR)**.

Use the chart below to see what your UACR result may mean.[1]

	UACR result	What it may mean
	Less than 30	Normal
	30 to 300	Microalbuminuria (small amount of protein)
	More than 300	Proteinuria (large amount of protein)

Use the chart on page 24 to track your urine test result.

How can I prevent or slow diabetic kidney disease?

The steps to prevent diabetic kidney disease are the same steps needed to slow diabetic kidney disease. You will need to:

- Control your blood sugar
- Control your blood pressure
- Control your **cholesterol**
- Follow a diabetic diet
- Avoid tobacco
- Be physically active
- Keep a healthy weight

Control Your Blood Sugar

High blood sugar can damage the kidneys. Keeping your blood sugar in a healthy range can help protect your kidneys and prevent or slow diabetic kidney disease. A special diabetic diet, exercise and medicines can help you keep a healthy blood sugar level. You will need to check your blood sugar on a regular basis to know how you're doing.

Checking Your Blood Sugar Level at Home

To know your blood sugar level, you may need to test your blood at home. You can do this using a blood glucose meter (also called a **glucometer**). You can get a meter at your local drug store, hospital, clinic or online. Your doctor can help you find a meter that is right for you.

For most meters, you use a tiny pin (called a **lancet**) to prick the side of your finger. This makes a tiny drop of blood. You put the tiny drop of blood on a test strip that comes with your meter. Then, you put the test strip in the meter. The meter will show a number. This is your blood sugar level. Your doctor can also show you how to use your meter.

Ask your doctor how often you will need to check your blood sugar.

When I should check my blood sugar: _____

_____

Also ask your doctor what your blood sugar level should be. In most cases, your blood sugar should be:[2]

When to test	Normal blood sugar for most people	What my blood sugar should be
Before eating	70 to 130	
About 2 hours after eating	Less than 183	

Keep track of your blood sugar numbers. Write down your result and when you took the test. If your number is high, also write down what you had to eat before the test. Share these numbers with your doctor at your next visit.

Use the chart on the next page to get started.

Date	Blood sugar level	Time	Comments
Example: Monday	101	Before breakfast	
Example: Monday	192	2 hours after breakfast	Ate pancakes w/ syrup

Tell your doctor if your blood sugar is often too high or too low. If your blood sugar is low, eat a **glucose tablet**, raisins, hard candy or honey. You can also drink fruit juice, milk or a sugary soda. Check your blood sugar again after 15 minutes to make sure it is not still low. Tell your doctor if this happens more than once.

Checking Your Blood Sugar Level with Your Doctor

Another test your doctor might suggest is called the **hemoglobin A1C**, or "A1C" for short. This is a blood test that tells how your blood sugar has been over the last 2 or 3 months.

Ask your doctor what your A1C result should be. The goal for most people with diabetes is an A1C less than 7%.[2]

Use the chart on page 24 to track your A1C result.

Learn More - A **diabetes educator** can help you learn how to control your blood sugar. Ask your doctor to refer you to a diabetes educator in your area. You can also get a listing of diabetes educators from the American Association of Diabetes Educators at **1.800.338.3633** or **www.diabeteseducator.org**. Medicare and many insurance companies will help pay for sessions with a diabetes educator.

Control Your Blood Pressure

High blood pressure can also harm your kidneys. In fact, high blood pressure is the #2 cause of kidney failure. Remember, diabetes is the #1 cause. Having both diabetes and high blood pressure puts you more at risk for kidney disease and heart disease.

For people with diabetes, a normal blood pressure is less than 130/80. [2] Ask your doctor how often you should get your blood pressure checked. If your blood pressure is high, ask your doctor what you can do to lower it.

If you have high blood pressure, your doctor may prescribe an **ACE inhibitor** or an **ARB**. These special types of blood pressure medicines can also help protect your kidneys.

Your doctor might also prescribe an ACE inhibitor or an ARB if you have diabetes and any signs of kidney disease, even if you do not have high blood pressure. Ask your doctor if either an ACE inhibitor or an ARB is right for you.

Control Your Cholesterol

Having high cholesterol, especially if you have diabetes, puts you more at risk for kidney disease, heart disease and stroke. It can also cause diabetic kidney disease to get worse faster.

For most people, normal cholesterol levels are:

	Normal for most
Total cholesterol	Less than 200
HDL ("good" cholesterol)	More than 40
LDL ("bad" cholesterol)	Less than 100

Use the chart on page 24 to track your cholesterol results.

Your **triglycerides** are also important. People with high triglycerides are at more risk for kidney disease, heart disease and stroke. For most people, a healthy triglyceride level is less than 150.[3]

If your total cholesterol, **LDL** or triglycerides are high, or if your **HDL** is low, talk to your doctor. Your doctor may suggest exercise, diet changes or medicines to help you get to a healthy cholesterol level.

Follow a Diabetic Diet

What you eat can affect your diabetes. Ask a diabetes educator or **dietitian** about:

- What to eat
- How much to eat
- How often to eat

Picking healthy foods, eating smaller meals and eating more often can help you control your diabetes and prevent problems.

A dietitian or diabetes educator can help you plan your meals and learn more about a healthy diabetic diet. Medicare and many insurance plans will even help pay for sessions with an expert. Check with your insurance to see if it will cover **medical nutrition therapy (MNT)**.

To find a diabetes educator in your area, contact the American Association of Diabetes Educators at **1.800.338.3633** or **www.diabeteseducator.org**. To find a dietitian in your area, contact the American Dietetic Association at **1.800.877.1600** or **www.eatright.org**.

Avoid Tobacco

Using tobacco (smoking or chewing) puts you more at risk for kidney disease and many other health problems. If you already have kidney disease, using tobacco can make it get worse faster.

If you use tobacco, quitting can help lower your chances of getting kidney disease or help slow the disease down if you already have it.

Be Physically Active

Exercise can help your body use insulin better. This makes it easier to keep your blood sugar in check. Staying active also helps control your blood pressure and cholesterol.

To get the most benefit, exercise for at least 30 minutes, 5 days of the week. If that seems like too much, start out slow and work your way up. Look for fun activities that you enjoy. Try walking with a friend, dancing, swimming or playing a sport. Adding just a little more activity to your routine can help.

Be sure to talk to your doctor before starting any exercise program.

Keep a Healthy Weight

Keeping a healthy weight can help you control your blood sugar and lower your risk for kidney disease. Talk to your doctor about how much you should weigh. If you are overweight, losing just a few pounds can make a big difference.

How can I learn more?

There are many resources that can help you learn how to control your diabetes and protect your kidneys:

American Association of Diabetes Educators
Phone: 800.338.3633
http://www.aadenet.org

American Diabetes Association
Phone: 800.342.2383 (800.DIABETES)
http://www.diabetes.org

Centers for Medicare and Medicaid Services
Phone: 800.633.4227 (800.MEDICARE)
http://www.medicare.gov

National Diabetes Education Program
Phone: 888.693.6337
http://www.ndep.nih.gov

National Institute of Diabetes and Digestive and Kidney Diseases
Phone: 800.891.5390
http://niddk.nih.gov

Glossary

ACE Inhibitor: Angiotensin-Converting Enzyme Inhibitor. A medicine used to treat high blood pressure. ACE inhibitors can also help prevent or slow kidney damage.

ARB: Angiotensin II Receptor Blocker/Inhibitor. A medicine used to treat high blood pressure. ARBs can also help prevent or slow kidney damage.

Blood Pressure: Your heart pumps blood through tubes called arteries and veins. The pumped blood makes pressure inside your arteries. This is called blood pressure. When your blood pressure is checked, it tells how hard your heart is working to pump your blood. For people with diabetes, a normal blood pressure is less than 130/80.[2]

Cholesterol: A waxy, fat-like substance in your blood. Your body needs some cholesterol, but too much cholesterol can raise your risk for heart disease and kidney disease. A normal total cholesterol is less than 200.[3]

Creatinine: A type of waste in the blood that comes from using your muscles in everyday activities. Healthy kidneys clean creatinine from the blood. When your kidneys are not working, creatinine can build up in your blood.

Diabetes: A disease that keeps the body from making or using insulin correctly. Your body needs insulin to get energy from sugar in the foods you eat. If your body can't make or use insulin correctly, sugar can build up in your blood and cause problems.

Diabetes Educator: An important member of your healthcare team. Diabetes educators can teach you how to better control your diabetes.

Diabetic Nephropathy: The medical name for kidney disease caused by diabetes.

Dialysis: A way of cleaning waste and extra fluid from the blood once the kidneys have failed. There are two types of dialysis: hemodialysis and peritoneal dialysis.

Dietitian: An important member of your healthcare team. A dietitian can help you control your diabetes through diet changes.

Estimated Glomerular Filtration Rate (eGFR): A number based on your blood test for creatinine. It tells how well your kidneys are working. An eGFR less than 60 for 3 months or more may be a sign of kidney disease.[1]

Glomeruli: The tiny blood vessels in your kidneys that filter your blood.

Glucometer: A small machine that you can use to test your blood sugar at home.

Glucose: The main sugar found in your blood. Your body turns many of the foods you eat into glucose. This is your body's main source of energy.

Glucose Tablet: A small, chewable tablet made of glucose. If your blood sugar drops too low, you can eat a glucose tablet to help bring it back to a healthy range.

HDL: Also called high density lipoprotein or "good" cholesterol. HDL carries cholesterol to the liver where it can be removed from the blood. An HDL level of more than 40 is good. An HDL level more than 60 is even better.[3]

Hemoglobin A1C (A1C): A blood test to check how your blood sugar has been over the last 2 or 3 months. Most people with diabetes should try to have an A1C less than 7%.[2]

Insulin: A hormone that helps your body turn the sugar you eat into energy. In diabetes, your body either doesn't make or use insulin correctly.

Kidney Disease: Permanent damage to the kidneys. The most common causes are diabetes and high blood pressure. If left untreated, kidney disease can lead to kidney failure.

Kidney Failure: When the kidneys don't work well enough to clean your blood. A person with kidney failure will need dialysis or a kidney transplant to live.

Kidney Transplant: When a failed kidney is replaced by a healthy one. A kidney transplant can come from a living donor or from someone who has just died.

LDL: Also called low density lipoprotein or "bad" cholesterol. A high LDL level puts you more at risk for kidney disease, heart disease and stroke. A normal LDL level is less than 100.[3]

Medical Nutrition Therapy (MNT): Using nutrition to help control chronic conditions like diabetes, heart disease or kidney disease. MNT usually means working with a dietitian to make healthy changes to your diet.

Proteinuria: The medical name for protein in your urine. This may be an early sign of kidney disease.

Triglycerides: A type of fat in the blood. Normal triglycerides are less than 150.[3] High triglycerides can raise your risk of heart disease and kidney disease.

Urine Albumin-to-Creatinine Ratio (UACR): A urine test that compares the amount of albumin (protein) to the amount of creatinine in your urine. A normal UACR is less than 30.[1]

References

[1]National Kidney Disease Education Program. (2008, March). *Quick Reference on UACR and GFR, In Evaluating Patients with Diabetes for Kidney Disease.* Retrieved from http://www.nkdep.nih.gov/resources/uacr_gfr_quickreference.htm

[2]American Diabetes Association. (2009, January). *Standards of Medical Care in Diabetes—2009, 32 (S1), S13-S61. DOI: 10.2337/dc09-S013*

[3]National Cholesterol Education Program. (2005, June). *High Blood Cholesterol, What you need to know.* Retrieved from National Heart Lung and Blood Institute website at http://www.nhlbi.nih.gov/health/public/heart/chol/wyntk.pdf

My healthcare team

Diabetes takes teamwork. Know your healthcare team. Tell your healthcare team members about any changes in your health. The following table can help you keep track of your doctors and appointments.

Type of doctor	Name	Phone number	Next appointment
Primary care doctor			
Diabetes educator			
Dietitian			
Pharmacist			
Nephrologist (kidney doctor)			

My medicines

When you visit your doctors, they may ask you what medicines you are taking. Your doctors need to know this, because some medicines should not be taken with others. Some medicines can also harm your kidneys. Use this chart to keep track of your medicines. Include any over-the-counter medicines and supplements you are taking.

Medication	Dose	When to take it	Prescribing doctor
Example: Vitamin C	50mg	With breakfast	Dr. Kidd Knee

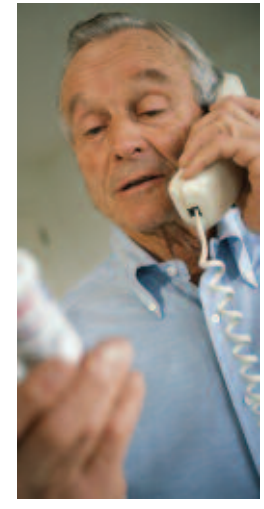
Take your medicines how your doctors prescribe, even if you feel fine.

My lab results

Knowing your numbers can help you stay healthy. See how your numbers compare to the normal results in the chart below. If your numbers are too high or too low, talk to your doctor about what you can do to control them. Also ask your doctor when you should be tested again.

	Normal for most	My result	When to test again
Blood tests			
eGFR (page 4)	More than 60		
A1C (page 10)	Less than 7%		
Total cholesterol (page 12)	Less than 200		
HDL (page 12)	More than 40		
LDL (page 12)	Less than 100		
Triglycerides (page 12)	Less than 150		
Urine tests			
UACR (page 5)	Less than 30		
Other tests			
Blood pressure (page 11)	Less than 130/80		

My questions



These are some questions that you may want to ask your doctor at your next visit. Please look at all of the questions first to see which ones apply to you. There is space on the next page for you to write in your own questions that you would like to ask your doctor at your next visit.

Questions about my tests:

- Is the eGFR test right for me?
- When should I test my blood sugar at home?
- What should my blood sugar be when I test at home?
- What should my A1C result be?
- How often should I check my blood pressure?
- How can I keep a healthy blood pressure?

Questions about specialists:

- Can you refer me to a diabetes educator or a dietitian?
- Should I see a nephrologist (kidney specialist)?

Questions about my medicines:

- Is an ACE inhibitor or an ARB right for me?

Questions about my lifestyle:

- What can I do to control my cholesterol levels?
- How can I get help to stop using tobacco?
- Am I healthy enough to start an exercise program?
- How much should I weigh?

Additional Questions:

Notes:

Where to Find More Help

To learn more, visit our website at **www.kidneyfund.org**. If you still have questions, call the American Kidney Fund's toll-free HelpLine at **1.866.300.2900** or e-mail us at **helpline@kidneyfund.org**.

American Kidney Fund

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Combined Federal Campaign #11404

American Kidney Fund

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