Prevent diabetes problems

Keep your kidneys healthy

NIDDK
NATIONAL INSTITUTES OF HEALTH
National Diabetes Information Clearinghouse

Prevent diabetes problems: Keep your kidneys healthy

NIDDK
NATIONAL INSTITUTES OF HEALTH
National Diabetes Information Clearinghouse

Contents

What are diabetes problems? 3

What should I do each day to stay healthy with diabetes? 4

What do my kidneys do? 5

How can I prevent diabetes kidney problems? 6

Is there a medicine to slow down kidney damage? 8

How can my doctor protect my kidneys during special x-ray tests? 8

How can diabetes hurt my kidneys? 9

What can I do if I have diabetes kidney problems? 11

How will I know if my kidneys fail? 12

What happens if my kidneys fail? 13

Will I know if I start to have kidney problems? 15

How can I find out if I have kidney problems? 15

Will my doctor do other kidney tests? 16

For more information 17

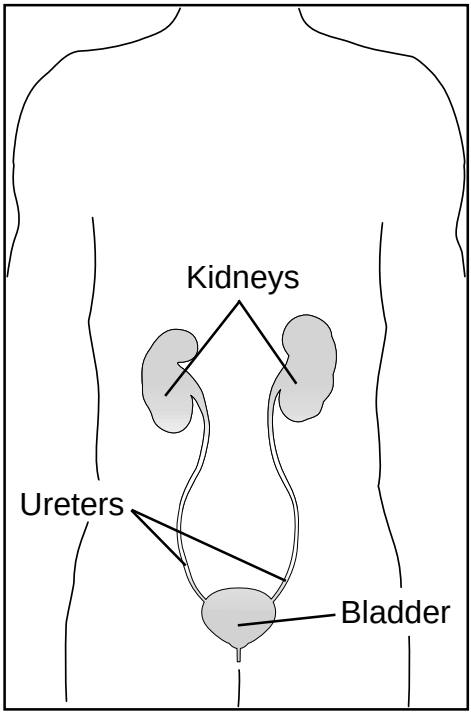
More in the series 19

Acknowledgments 20

What are diabetes problems?

Too much sugar in the blood for a long time causes diabetes problems. This high blood sugar can damage many parts of the body, such as the kidneys, heart, and blood vessels. Diabetes problems can be scary, but there is a lot you can do to prevent them or slow them down.

This booklet is about kidney problems caused by diabetes. You will learn the things you can do each day and during each year to stay healthy and prevent diabetes problems.



High blood sugar can cause kidney problems.

What should I do each day to stay healthy with diabetes?

Follow the healthy eating plan that you and your doctor or dietitian have worked out. Eat your meals and snacks at around the same times each day.

Be active a total of 30 minutes most days. Ask your doctor what activities are best for you.

Take your diabetes medicine at the same times each day.

Check your blood sugar every day. Each time you check your blood sugar, write the number in your record book. Call your doctor if your numbers are too high or too low for 2 to 3 days.

Check your feet every day for cuts, blisters, sores, swelling, redness, or sore toenails.

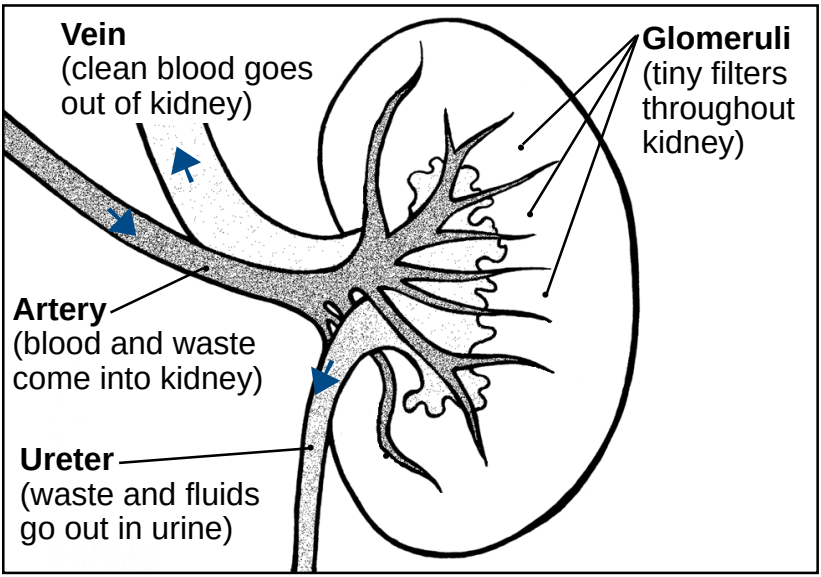
Brush and floss your teeth and gums every day.

Don’t smoke.

What do my kidneys do?

The kidneys act as filters to clean the blood. They get rid of waste and extra fluid. The tiny filters throughout the kidneys are called glomeruli (glo-MEHR-yoo-lie).

When kidneys are healthy, the artery (AR-ter-ee) brings blood and waste from the bloodstream into the kidney. The glomeruli clean the blood. Then waste and extra fluid go out into the urine through the ureter. Clean blood goes out of the kidney and back into the bloodstream through the vein.

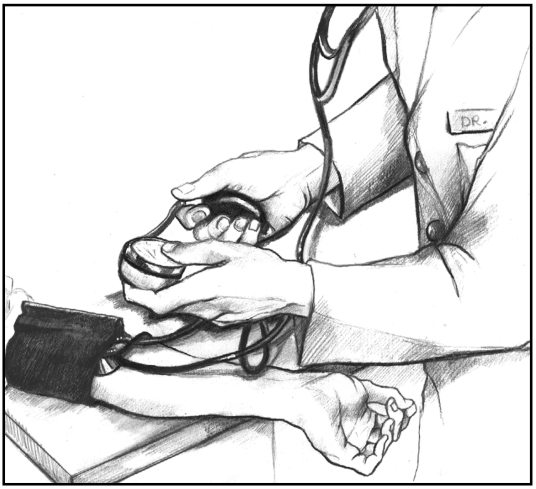


You have two kidneys. Your kidneys clean your blood and make urine. Here is a simplified drawing of one.

How can I prevent diabetes kidney problems?

- Keep your blood sugar as close to normal as you can. Ask your doctor what blood sugar numbers are healthy for you.
- Keep your blood pressure below 130/85 to help prevent kidney damage. Blood pressure is written with two numbers separated by a slash. For example: 120/70.

  Ask your doctor what numbers are best for you. If you take blood pressure pills, take them as your doctor tells you. Keeping your blood pressure under control will also slow damage to your eyes, heart, and blood vessels.

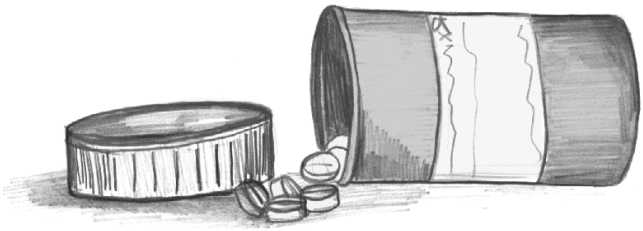


Keep your blood pressure below 130/85.

- Follow the healthy eating plan you work out with your doctor or dietitian. Change your meal plan as your doctor and dietitian suggest. They might suggest you eat less protein, sodium, and potassium.
- Have your kidneys checked at least once a year by having your urine tested for small amounts of protein.
- Have any other kidney tests that your doctor thinks you need.
- See a doctor for bladder or kidney infections right away. You may have an infection if you have these symptoms:
  - Pain or burning when you urinate
  - Frequent urge to go to the bathroom
  - Urine that looks cloudy or reddish
  - Fever or a shaky feeling
  - Pain in your back or on your side below your ribs.

Is there a medicine to slow down kidney damage?

Yes. Your doctor might ask you to take a medicine called an ACE inhibitor (in-HIB-it-ur). This medicine helps control blood pressure. ACE inhibitors also help people with diabetes to slow down kidney damage by keeping the kidneys from cleaning out too much protein. New medicines now being tested may also hold promise.



Your doctor might ask you to take an ACE inhibitor to control your blood pressure.

How can my doctor protect my kidneys during special x-ray tests?

If you have kidney damage, the liquid, called a contrast agent, used for special x-ray tests can make your kidney damage worse. Your doctor can give you extra water before and after the x-ray to protect your kidneys. Or your doctor may decide to order a test that does not use a contrast agent.

How can diabetes hurt my kidneys?

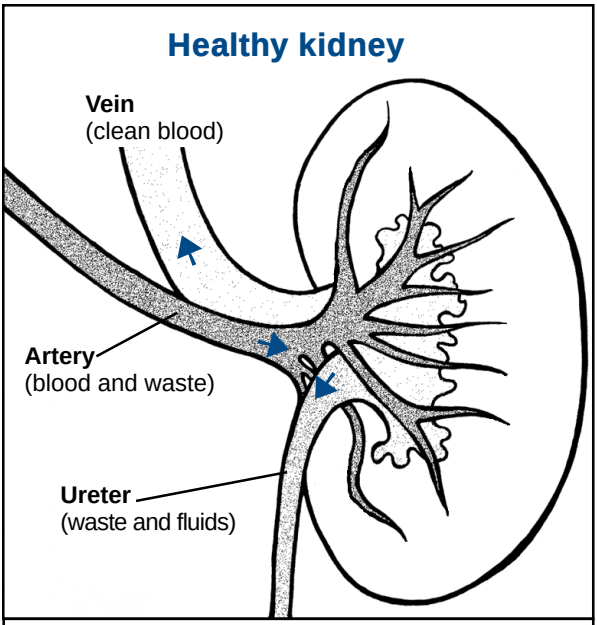
When kidneys are working well, the glomeruli keep protein inside your body. You need the protein to stay healthy.

High blood sugar and high blood pressure damage the kidneys' glomeruli. When the kidneys are damaged, the protein leaks out of the kidneys into the urine. Damaged kidneys do not do a good job of cleaning out waste and extra fluids. So not enough waste and fluids go out of the body as urine. Instead, they build up in your blood.

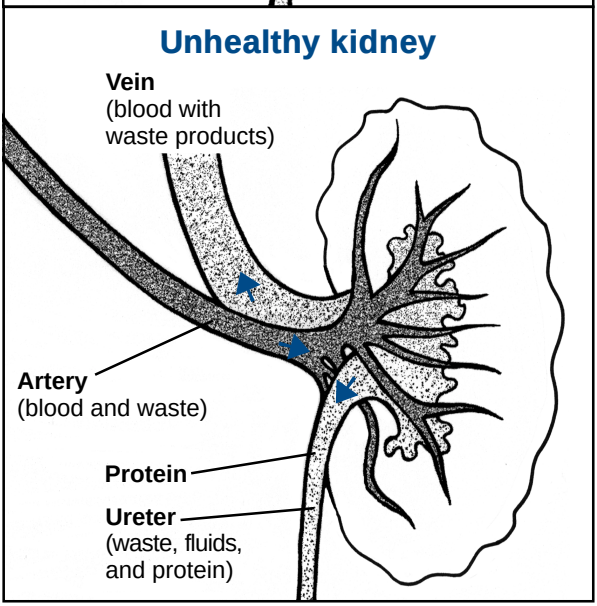
An early sign of kidney damage is when your kidneys leak small amounts of a protein called albumin (al-BYOO-min) into the urine.

With more damage, the kidneys leak more and more protein. This problem is called proteinuria (PRO-tee-NOOR-ee-uh). More and more wastes build up in the blood. This damage gets worse until the kidneys fail.

Diabetic nephropathy (neh-FROP-uh-thee) is the medical word for kidney problems caused by diabetes.



No protein is leaking from the healthy kidney.



Protein is leaking from the unhealthy kidney.

What can I do if I have diabetes kidney problems?

Once you have kidney damage, you cannot undo it. But you can slow it down or stop it from getting worse by doing the things on pages 6, 7, and 8.

Keeping blood pressure under control helps to keep your kidneys healthy.

How will I know if my kidneys fail?

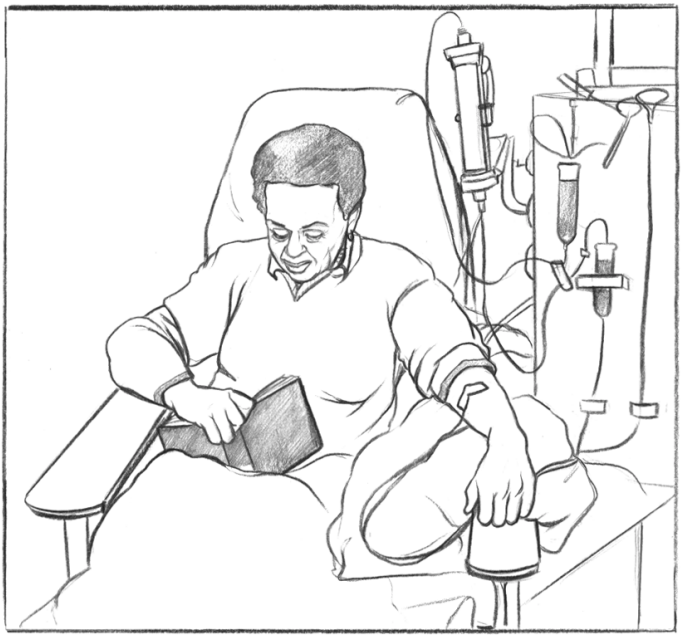
At first, you cannot tell. Kidney failure from diabetes happens so slowly that you may not feel sick at all for many years. You will not feel sick even when your kidneys do only half the job of normal kidneys. You may not feel any signs of kidney failure until your kidneys have almost stopped. However, getting your urine and blood tested every year can tell you if your kidneys are still working.

Once your kidneys fail, you may feel sick to your stomach and feel tired all the time. Your skin may turn yellow. You may feel puffy, and your hands and feet may swell from extra fluid in your body.

You may feel sick to your stomach when your kidneys stop working.

What happens if my kidneys fail?

First, you will need dialysis (dy-AL-ih-sis) treatment. Dialysis is a treatment that does the work your kidneys used to do. There are two types of dialysis (see page 14). You and your doctor will decide what type will work best for you.



Dialysis is a treatment that takes waste products and extra fluid out of your body.

1. **Hemodialysis** (HE-mo-dy-AL-ih-sis). In hemodialysis, your blood flows through a tube from your arm to a machine that filters out the waste products and extra fluid. The clean blood flows back to your arm.
2. **Peritoneal dialysis** (PEH-rih-tuh-NEE-ul dy-AL-ih-sis). In peritoneal dialysis, your belly is filled with a special fluid. The fluid collects waste products and extra water from your blood. Then the fluid is drained from your belly and thrown away.

Second, you may be able to have a kidney transplant. This operation gives you a new kidney. The kidney can be from a close family member, friend, or someone you do not know. You may be on dialysis for a long time. Many people are waiting for new kidneys. A new kidney must be a good match for your body.

Will I know if I start to have kidney problems?

No. You will know you have kidney problems only if your doctor tests your urine for protein. Do not wait for signs of kidney damage to have your urine tested.

How can I find out if I have kidney problems?

Each year make sure your doctor tests a sample of your urine to see if your kidneys are leaking albumin. If your kidneys are not leaking a lot of albumin, ask your doctor to check your urine for even smaller amounts of albumin. This is called microalbumin (MY-kro-al-BYOO-min).

It is good news if your kidneys are not leaking even small amounts of albumin. Then you and your doctor know your kidneys are working well.

Will my doctor do other kidney tests?

Maybe. Your doctor might test your blood to measure the amounts of creatinine (kree-AT-ih-nin) and urea (yoo-REE-uh). These are waste products your body makes. If your kidneys are not cleaning them out of your blood, they can build up and make you sick.

Your doctor might also ask you to collect your urine in a large container for a whole day or just overnight.

For more information

Diabetes Teachers (nurses, dietitians, pharmacists, and other health professionals)

To find a diabetes teacher near you, call the American Association of Diabetes Educators toll-free at 1–800–TEAMUP4 (1–800–832–6874), or look on the Internet at *www.aadenet.org* and click on "Find an Educator."

Recognized Diabetes Education Programs (teaching programs approved by the American Diabetes Association)

To find a program near you, call toll-free at 1–800–DIABETES (1–800–342–2383), or see *www.diabetes.org/education/edustate2.asp* on the Internet.

Dietitians

To find a dietitian near you, call the American Dietetic Association's National Center for Nutrition and Dietetics toll-free at 1–800–366–1655, or look on the Internet at *www.eatright.org* and click on "Find a Dietitian."

Government

The National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) is part of the National Institutes of Health. To learn more about kidney problems, write or call NKUDIC, 3 Information Way, Bethesda, MD 20892–3580, (301) 654–4415; or see *www.niddk.nih.gov* on the Internet.

More in the series

The "Prevent Diabetes Problems" series includes seven booklets that can help you learn more about how to prevent diabetes problems.

For free single copies of these booklets, call, write, fax, or email the

National Diabetes Information Clearinghouse
1 Information Way
Bethesda, MD 20892–3560

Phone: 1–800–860–8747 or (301) 654–3327
Fax: (301) 907–8906
Email: ndic@info.niddk.nih.gov

These booklets are also available under "Health Information" at *www.niddk.nih.gov* on the Internet.

Acknowledgments

The National Diabetes Information Clearinghouse thanks the people who helped review or field-test this booklet.

For American Association of Diabetes Educators
Lynn Grieger, R.D., C.D.E.
Arlington, VT
Celia Levesque, R.N., C.D.E.
Montgomery, AL
Teresa McMahon, Pharm.D., C.D.E.
Seattle, WA
Barbara Schreiner, R.N., M.N., C.D.E.
Galveston, TX

For American Diabetes Association
Phyllis Barrier, M.S., R.D., C.D.E.
Alexandria, VA
Linda Haas, Ph.C., R.N., C.D.E.
Seattle, WA
Kathleen Mahoney, M.S.N., R.N., C.D.E.
Drexel Hill, PA
Randi Kington, M.S., R.N., C.S., C.D.E.
Hartford, CT

Diabetes Research and Training Center
Albert Einstein School of Medicine
Norwalk Hospital
Norwalk, CT
Jill Ely, R.N., C.D.E.
Sam Engel, M.D.
Pam Howard, A.P.R.N., C.D.E.

Diabetes Research and Training Center
Indiana University School of Medicine
Indianapolis, IN
Madelyn Wheeler, M.S., R.D., F.A.D.A., C.D.E.

Diabetes Research and Training Center
VA/JDF Diabetes Research Center
Vanderbilt School of Medicine
Nashville, TN
Ok Chon Allison, M.S.N., R.N.C.S., A.N.P., C.D.E.
Barbara Backer, B.S.
James W. Pichert, Ph.D.
Alvin Powers, M.D.
Melissa E. Schweikhart
Michael B. Smith
Kathleen Wolffe, R.N.

Grady Health System Diabetes Clinic
Atlanta, GA
Ernestine Baker, R.N., F.N.P., C.D.E.
Kris Ernst, R.N., C.D.E.
Margaret Fowke, R.D., L.D.
Kay Mann, R.N., C.D.E.

Health Care Financing Administration
Baltimore, MD
Jan Drass, R.N., C.D.E.

Indian Health Service
Albuquerque, NM
Ruth Bear, R.D., C.D.E.
Dorinda Bradley, R.N., C.D.E.
Terry Fisher, R.N.
Lorraine Valdez, R.N., C.D.E.

Indian Health Service
Red Lake, MN
Charmaine Branchaud, B.S.N., R.N., C.D.E.

Medlantic Research Center
Washington, DC
Resa Levetan, M.D.

Texas Diabetes Council
Texas Department of Health
Austin, TX
Luby Garza-Abijaoude, M.S., R.D., L.D.

National Diabetes Information Clearinghouse

1 Information Way
Bethesda, MD 20892–3560
Phone: 1–800–860–8747 or (301) 654–3327
Fax: (301) 907–8906
Email: ndic@info.niddk.nih.gov

The National Diabetes Information Clearinghouse (NDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). NIDDK is part of the National Institutes of Health under the U.S. Department of Health and Human Services. Established in 1978, the clearinghouse provides information about diabetes to people with diabetes and to their families, health care professionals, and the public. NDIC answers inquiries; develops and distributes publications; and works closely with professional and patient organizations and Government agencies to coordinate resources about diabetes.

Publications produced by the clearinghouse are carefully reviewed for scientific accuracy, content, and readability.

This publication is not copyrighted. The clearinghouse encourages users of this booklet to duplicate and distribute as many copies as desired.

This booklet is also available under “Health Information” at *www.niddk.nih.gov* on the Internet.

U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
National Institutes of Health

NIDDK

National Institute of Diabetes and
Digestive and Kidney Diseases

NIH Publication No. 00–4281
May 2000