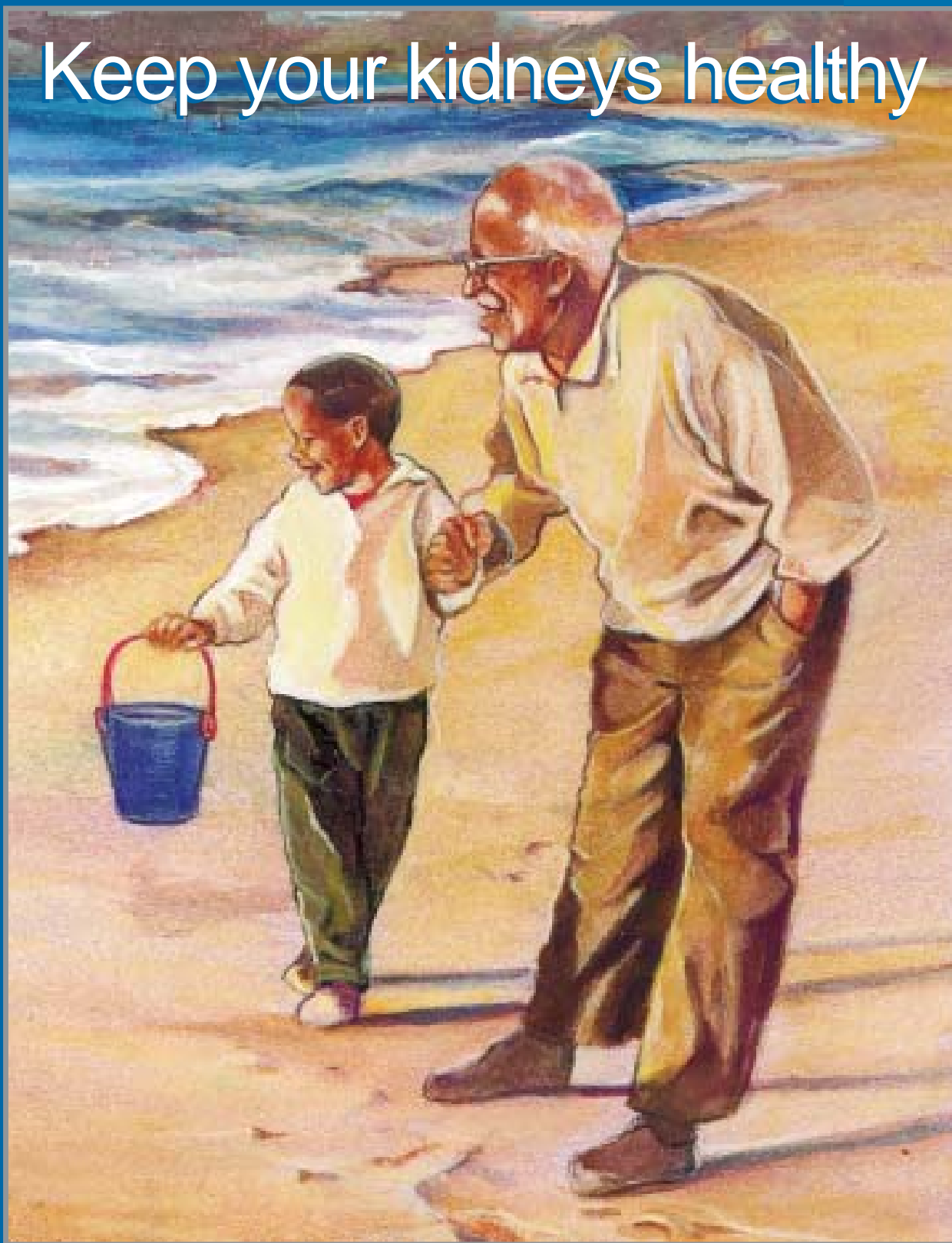


Prevent diabetes problems

Keep your kidneys healthy



Prevent diabetes problems: Keep your kidneys healthy



NATIONAL INSTITUTES OF HEALTH
National Diabetes Information Clearinghouse

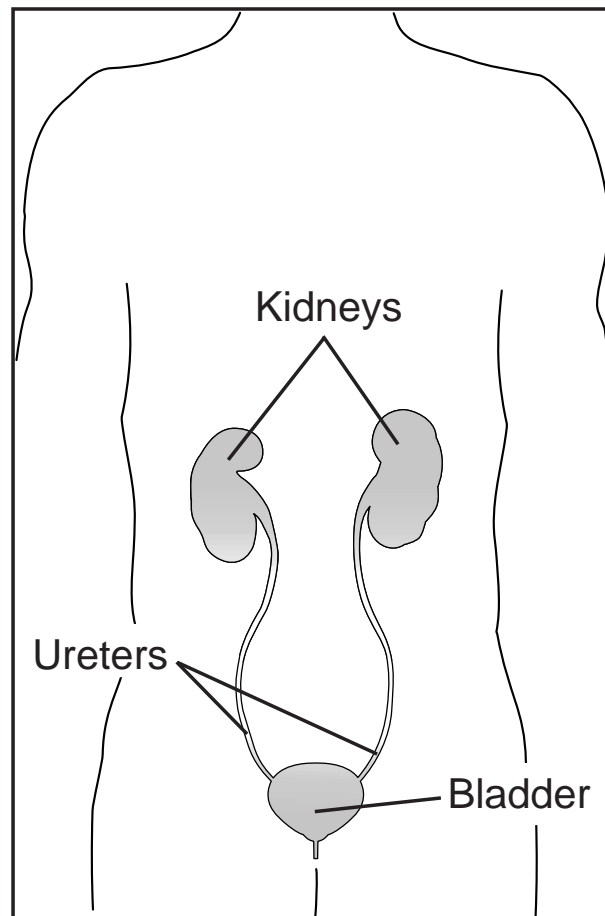
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What are diabetes problems?

Too much glucose (sugar) in the blood for a long time can cause diabetes problems. This high blood glucose (also called blood sugar) can damage many parts of the body, such as the heart, blood vessels, eyes, and kidneys. Heart and blood vessel disease can lead to heart attacks and strokes. You can do a lot to prevent or slow down diabetes problems.

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 glucose 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.



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



Take your diabetes medicines at the same times each day.



Check your blood glucose every day. Each time you check your blood glucose, write the number in your record book.



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



Brush and floss your teeth and gums every day.

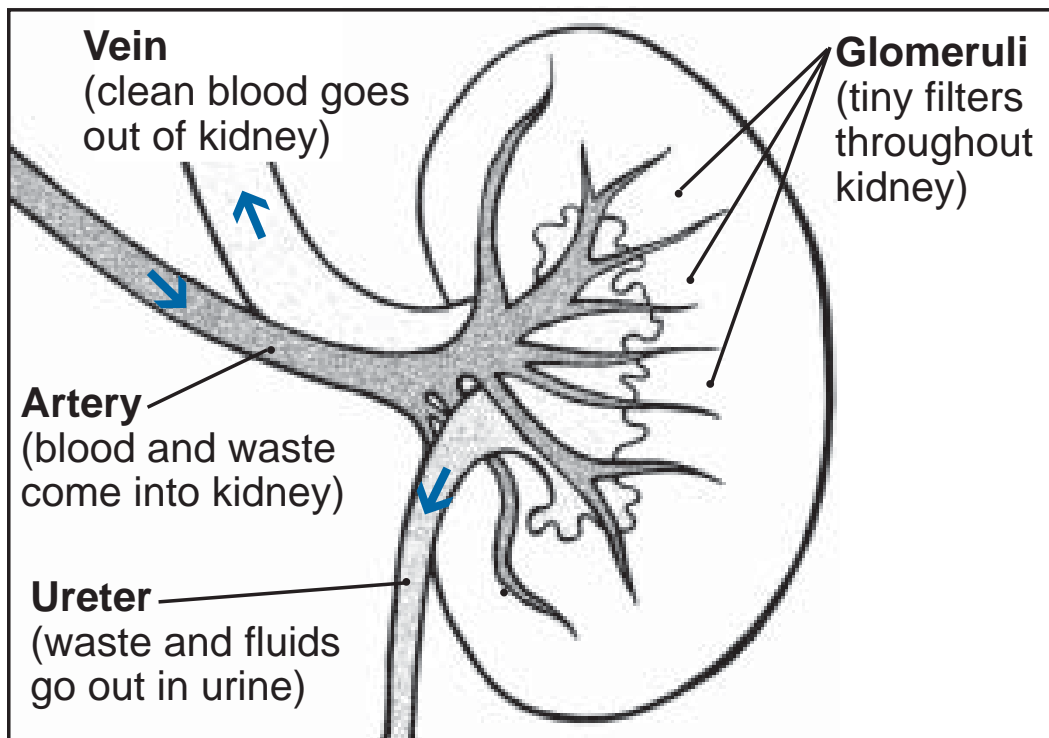


Don't smoke.

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 (gloh-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 glucose as close to normal as you can. Ask your doctor what blood glucose numbers are healthy for you.
- Keep your blood pressure below 130/80 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 130/80.

- If needed, take blood pressure pills that can also slow down kidney damage. Two kinds of pills can help:
 - ACE (angiotensin [an-gee-oh-TEN-sin] converting enzyme) inhibitor (in-HIB-it-ur)
 - ARB (angiotensin receptor blocker)
- Follow the healthy eating plan you work out with your doctor or dietitian. If you already have kidney problems, your dietitian may suggest that you cut back on protein, such as meat.
- Have your kidneys checked at least once a year by having your urine tested for small amounts of protein.



Pills can help you control your blood pressure and slow down kidney damage.

- 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

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?

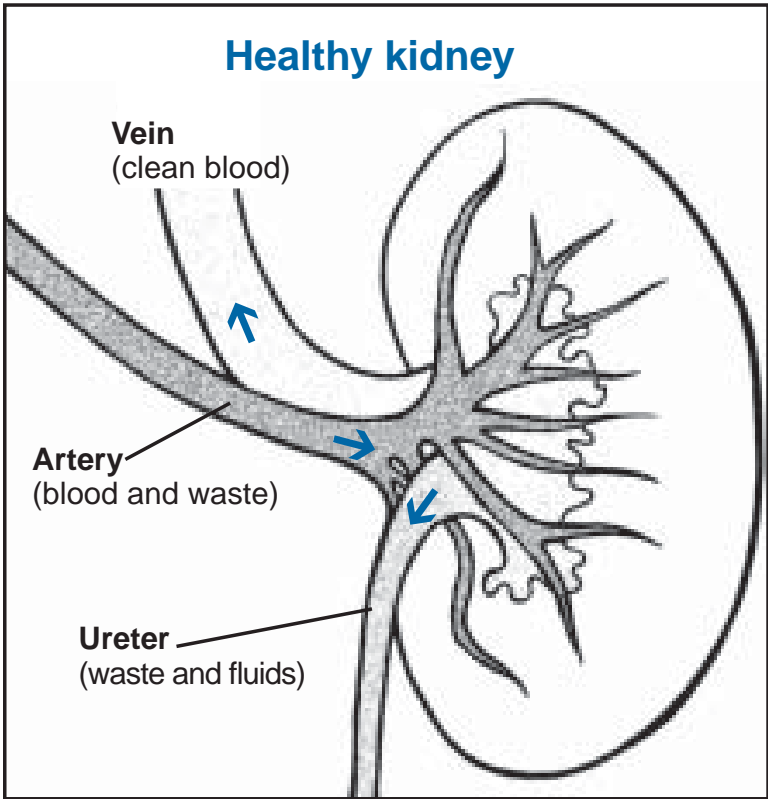
When kidneys are working well, the tiny filters in your kidneys, the glomeruli, keep protein inside your body. You need the protein to stay healthy.

High blood glucose and high blood pressure damage the kidneys' filters. 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.

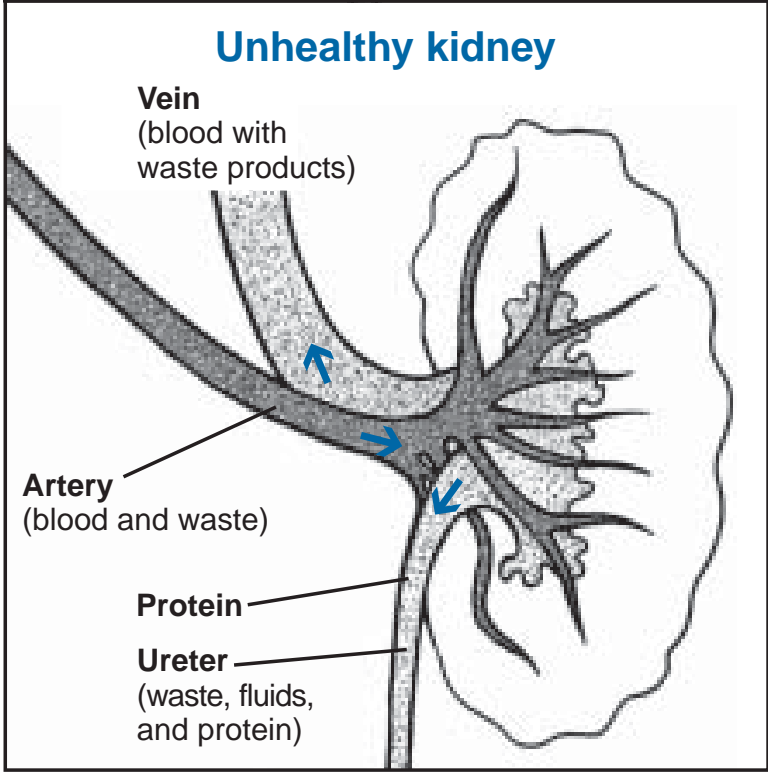
An early sign of kidney damage is when your kidneys leak small amounts of a protein called albumin (al-BYOO-min) into the urine.

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 term 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 4, 5, and 6.



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 working. However, getting your urine and blood checked every year can tell you if your kidneys are still working.

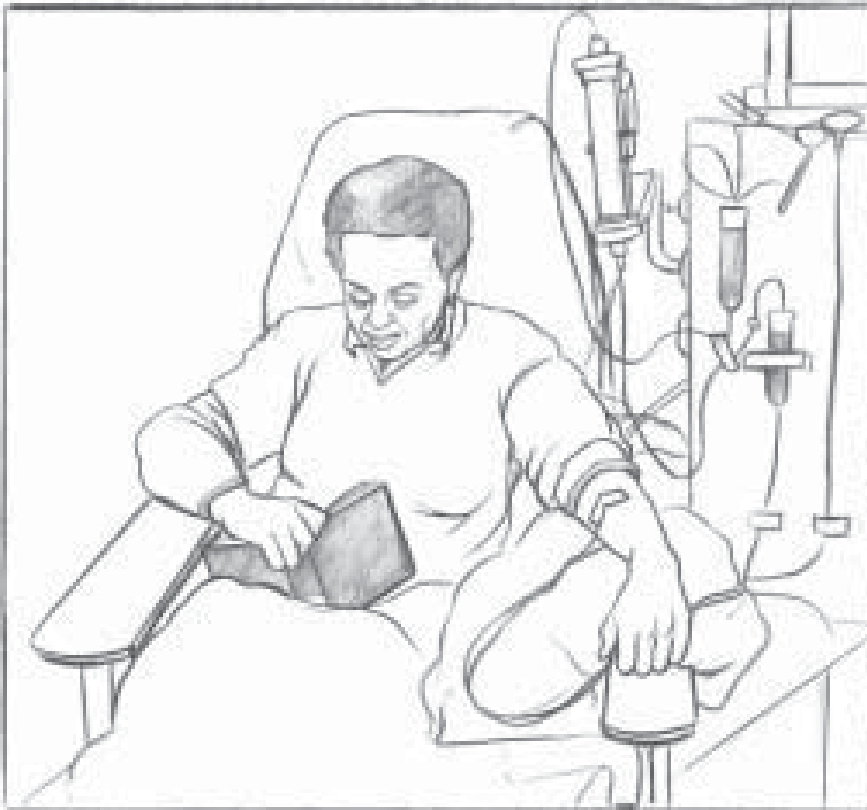
Once your kidneys fail, you may feel sick to your stomach and feel tired all the time. Your skin may turn yellow. You may feel puffy, and your hands and feet may swell from extra fluid in your body.



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 12). 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 checks your urine for protein. Do not wait for signs of kidney damage to have your urine checked.

How can I find out if I have kidney problems?

Each year make sure your doctor checks a sample of your urine to see if your kidneys are leaking small amounts of protein called microalbumin (MY-kro-al-BYOO-min).

The test results will tell you how well your kidneys are working.

Other tests can be done to check your kidneys. Your doctor might check 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. Then the urine will be checked for protein.

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.diabeteseducator.org and click on “Find a Diabetes Educator.”



Dietitians

To find a dietitian near you, call the American Dietetic Association toll-free at 1-800-366-1655, or look on the Internet at www.eatright.org and click on “Find a Nutrition Professional.”

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, 1-800-891-5390 or (301) 654-4415; or see www.kidney.niddk.nih.gov on the Internet.

To get more information about taking care of diabetes, contact

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

Internet: www.diabetes.niddk.nih.gov

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1 Diabetes Way

Bethesda, MD 20892-3600

Phone: 1-800-438-5383

Fax: (301) 907-8906

Internet: <http://ndep.nih.gov>

American Diabetes Association

1701 North Beauregard Street

Alexandria, VA 22311

Phone: 1-800-342-2383

Internet: www.diabetes.org

Juvenile Diabetes Research Foundation

International

120 Wall Street

New York, NY 10005-4001

Phone: 1-800-533-2873

Internet: www.jdrf.org

More in the Series

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



For free single copies of these booklets, write, call, 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 at www.diabetes.niddk.nih.gov on the Internet.

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Publications produced by the clearinghouse are carefully reviewed by both NIDDK scientists and outside experts.

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This booklet is also available at www.diabetes.niddk.nih.gov.



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National Institute of Diabetes and
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